Zanzibar Protectorate.

Annual Report

ON THE

Medical, Sanitary and Biological Divisions

FOR THE YEAR

1928

ZANZIBAR:

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1929.

Office of the Director of
Medical and Sanitary Services,

Zanzibar, 30th September, 1929.

Sir,

I have the honour to submit for the information of His Excellency the British Resident and for transmission to the Right Honourable the Secretary of State, the Medical Report on the Health and Sanitary conditions of the Zanzibar Protectorate for the year 1928, together with the Returns, etc., appended thereto.

I have also the honour to submit the Annual Report of the Veterinary Division.

I have the honour to be,

Sir,

Your obedient Servant,

J. A. TAYLOR,

Director of Medical and Sanitary Services,
Zanzibar Protectorate.

The Honourable,
The Chief Secretary to the Government,
Zanzibar Protectorate.

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A MAP OF ZANZIBAR ISLAND

SCALE

1 INCH TO 6 ENGLISH MILES

6 3 0 6 MILES

Hospital ■

Dispensary ●

Proposed Dispensary ○

Mkokotoni

NORTHERN

Mbiji

Chaani

DISTRICT

Mangapwani

Mahonda

Selem

Bububu

Machui

Uzini

Mwera

INDIAN OCEAN

Quarantine Station

ZANZIBAR CITY

Mwembeladu

Chwaka

Tunguu

SOUTHERN DISTRICT

CHUMBE ISLAND

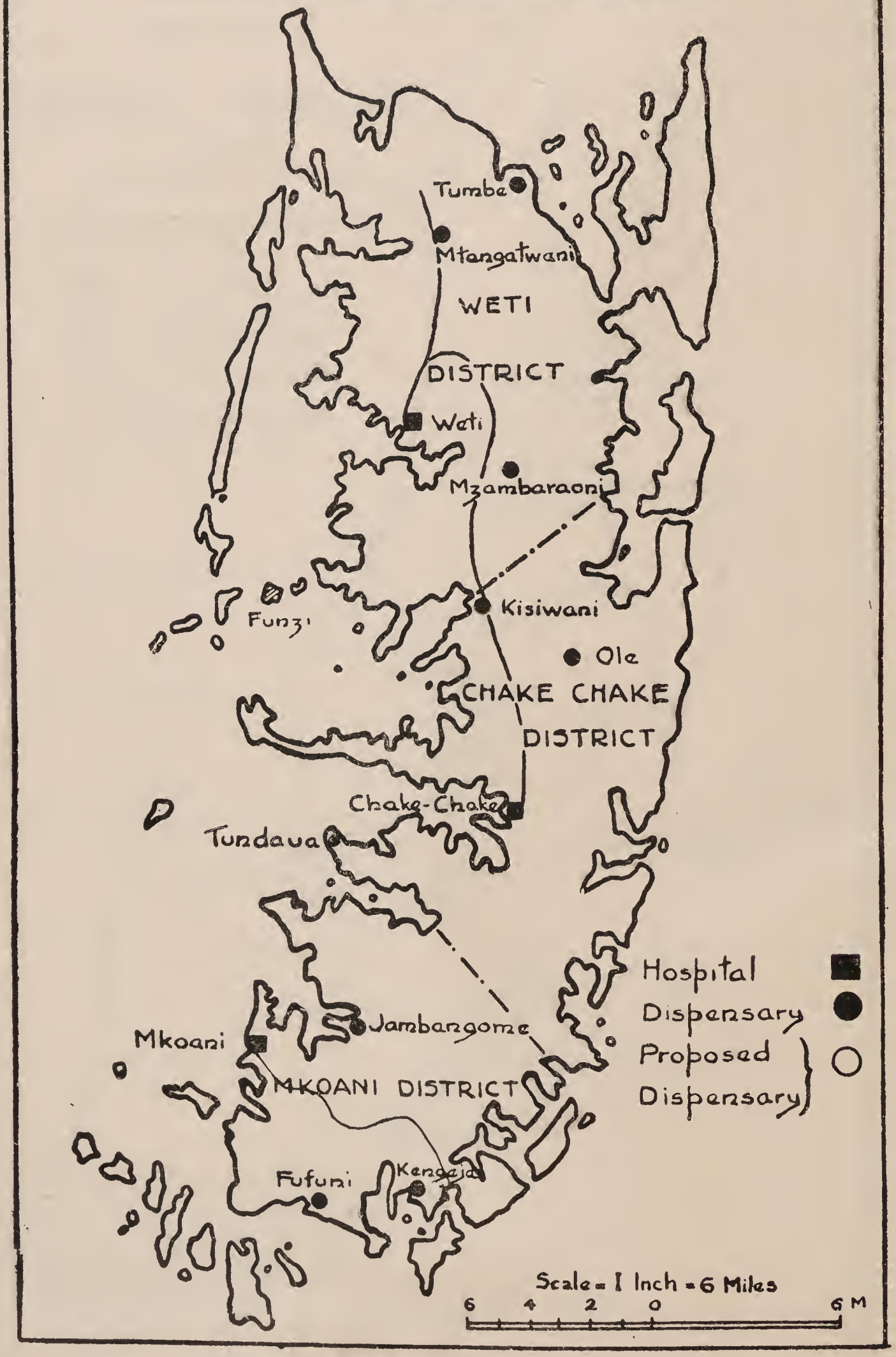
Bwelao

Unguja Ukuu

Kizimkazi

Makunduchi

SKETCH MAP OF PEMBA ISLAND



Zanzibar Protectorate.

REPORT ON THE MEDICAL, SANITARY AND BIOLOGICAL DIVISIONS

FOR THE YEAR 1928.

I. ADMINISTRATION.

(A) STAFF.

The establishment for 1928 as sanctioned in the estimates was as follows:—

EUROPEANS.

One Director of Medical and Sanitary Services.
One Deputy Director of Sanitary Services.
One Resident Surgical Officer.
Eight Medical Officers.
One Economic Biologist.
One Sanitary Superintendent.
One Accountant and Store-keeper.
One Sanitary Inspector.
One Matron.
Seven Nurses.
Two Missionary Nursing Sisters, Leper Settlement.

ASIATICS.

One Senior Sanitary Inspector.
One Assistant Surgeon.
Seven Sub-Assistant Surgeons.
Eight Dispensers.
Twenty-seven Sanitary Inspectors
One Chief Clerk.
Twelve Clerks.
One Senior Laboratory Assistant.
One Junior Laboratory Assistant.
One Engineer Foreman.

NATIVES.

One Dispenser.
One Laboratory Assistant.
Twenty-seven Apprentice Dispensers.
Hospital, Dispensary, Laboratory and Store Attendants.
Infectious Diseases Hospital Attendants.
Vaccinators.
Menial Staff.

(B) LEGISLATION AFFECTING PUBLIC HEALTH ENACTED DURING THE YEAR.

No legislation affecting public health was enacted during the year, but comprehensive Public Health and Township Bills were introduced into the Legislative Council and at the end of the year were under consideration by Select Committees.

(C) FINANCIAL.

(*Vide* Table II for further details.)

REVENUE.		£
Hospital fees, sale of drugs, etc.	...	1,044
Contribution from other dependencies towards Quarantine Services	...	2,637
Total Revenue	...	3,681

EXPENDITURE.		£
Personal Emoluments	...	37,383
Other Charges	...	11,309
Special Expenditure	...	511
Total Expenditure	...	49,202

Deducting the cost of the Veterinary Division and the contribution of other dependencies towards the cost of the Quarantine Service, the Medical Department expenditure for the year amounted to £45,360, or 9.61 per cent of the total revenue and 7.57 per cent of the total expenditure of the Protectorate for the year. These percentages, however, would be considerably reduced if Street Cleaning and certain smaller items such as Burial of Destitutes and Purchase of Opium (for habitues) were shown under a more appropriate head. On the other hand, it is only right to mention that no account has been taken of capital and maintenance charges on hospitals, dispensaries and houses for the staff, nor of anti-malarial or drainage work undertaken.

Diagram showing the Proportion of the different Diseases (with deaths) under each Group Treated at Hospitals and Dispensaries.

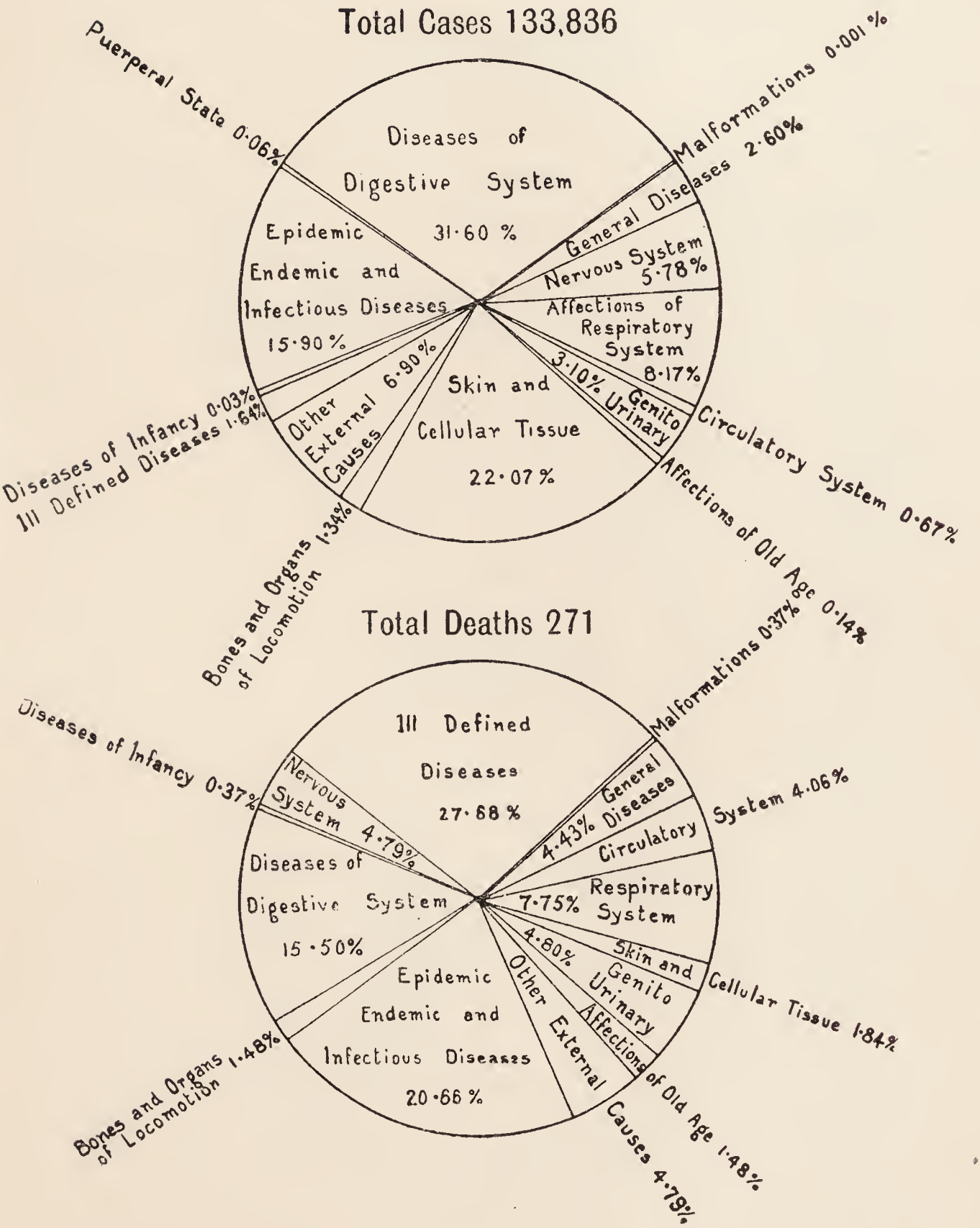
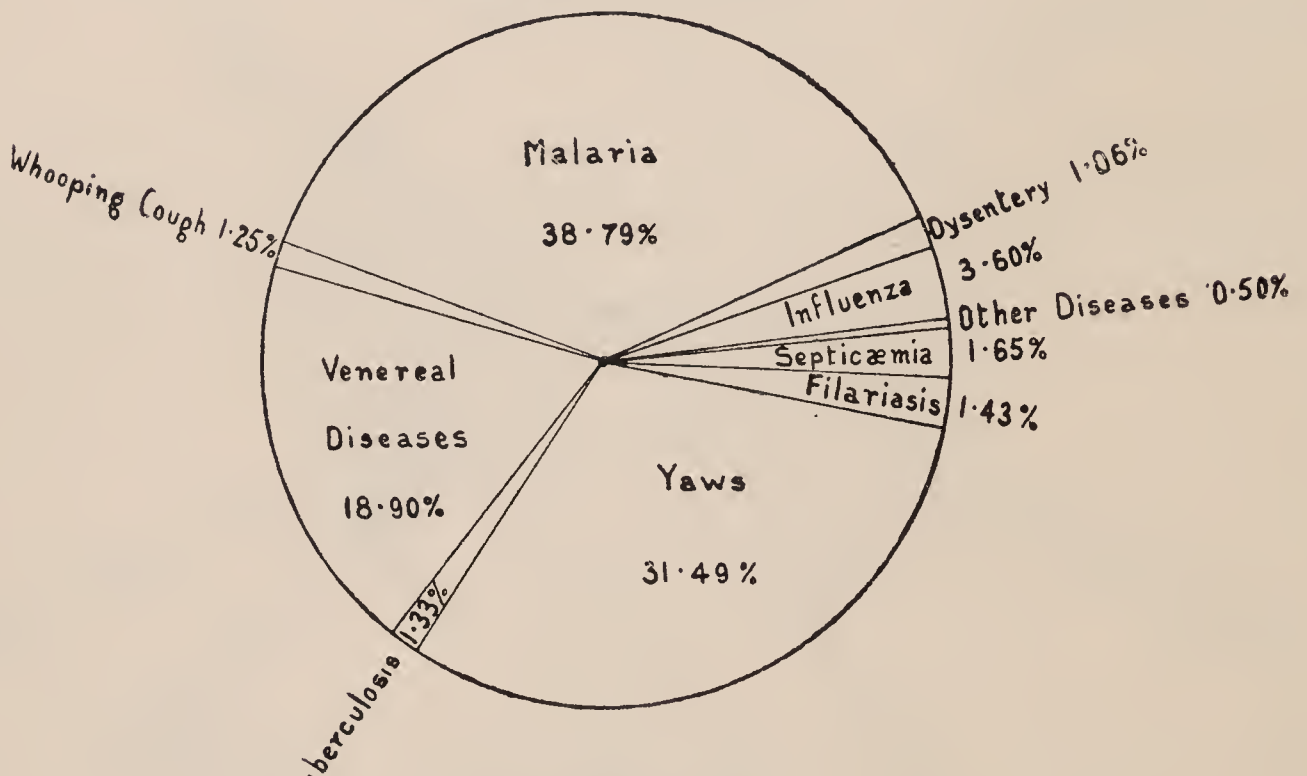
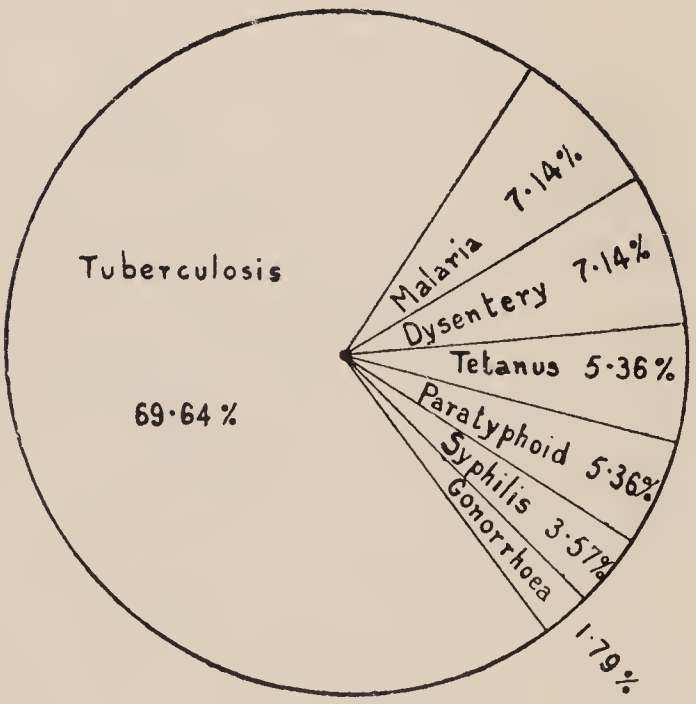


Diagram showing the Proportion of the different Epidemic, Endemic and Infectious Diseases (with deaths) under each Group Treated at Hospitals and Dispensaries.

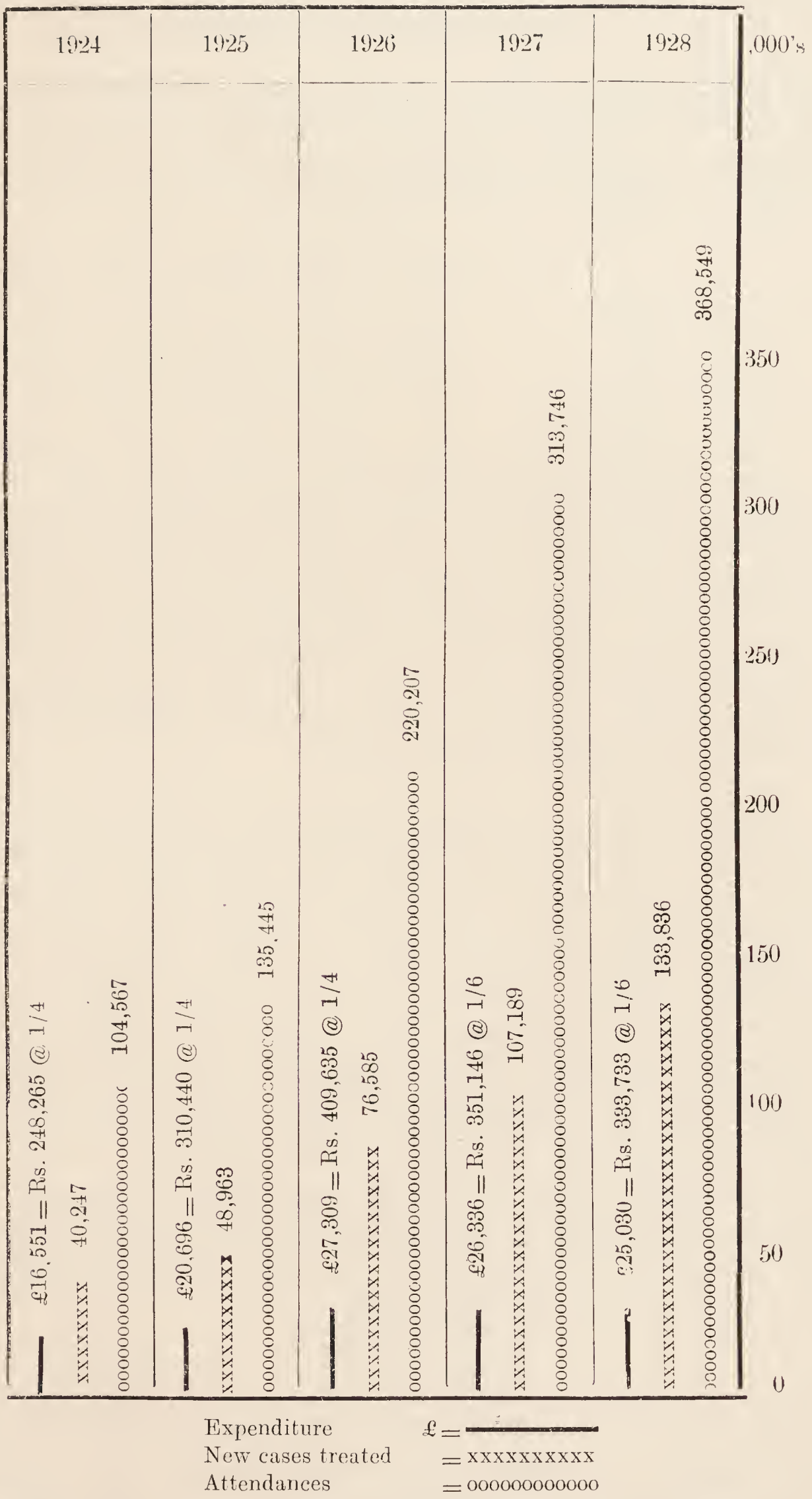
Total Cases 21,275



Total deaths 56



Comparative chart showing expenditure, new cases treated and attendances during the five years 1924—1928.



Expenditure includes personal emoluments of the Director of Medical and Sanitary Services and the medical staff, excluding sanitation, biological and veterinary divisions.

The treatment of lepers and expenses in connection with Leper Settlements are not included.

II. PUBLIC HEALTH.

(A) GENERAL REMARKS.

During the past year the attendances for treatment at all Govern-Hospitals and Dispensaries numbered 368,549, of which 133,836 were new cases and 234,713 repetitions. These figures compare with those of the preceding four years as follows:—

	1924.	1925.	1926.	1927.	1928.
New cases	40,247	48,963	76,585	107,189	133,836
Repetitions	64,320	86,482	143,622	206,557	234,713
Total Attendances	104,567	135,445	220,207	313,746	368,549

The large increase in attendances evidenced by these figures is chiefly due to the extension of the District Dispensary Service. The chart on the preceding page graphically illustrates the small cost at which this extension has been achieved, and it is estimated that the provision of a further £2,000 per annum would in a short period cause last year's figures to be doubled and not only bring some form of medical aid within reach of the whole native population, but also enable valuable propaganda and minor public health measures to be undertaken throughout the Protectorate.

The standard of treatment provided by the district dispensaries may leave much to be desired, but with increased supervision it will improve year by year, and there is no doubt that even at present many lives are saved, many minor ailments are prevented from becoming serious hospital cases, and much disability, pain and suffering obviated. Moreover, the most ardent believer in witch-craft, charms and incantations has no hesitation in seeking treatment for such conditions as wounds and injuries of which the cause is obvious, and the dispensaries thus serve as valuable instruments for obtaining confidence and breaking down prejudice.

As pointed out in a previous report (1926), much greater difficulty is experienced in obtaining the confidence of the women than of the men, but it is satisfactory to note from the following figures that some progress has been made:—

	New Cases Treated.			Percentage.		
	1926.	1927.	1928.	1926.	1927.	1928.
Males	62,784	83,100	102,137	81.98	77.53	76.31
Females	13,801	24,089	31,699	18.02	22.47	23.69
	76,585	107,189	133,836	100.00	100.00	100.00

The following table shows the total number of cases in each group of diseases treated during the year and the percentage of the number of cases in each group to the total number of cases treated:—

Group.		Cases.	Percentage of total number of cases.
I.	Epidemic, Endemic and Infectious Diseases ...	21,275	15.90
II.	General Diseases not included above ...	3,484	2.60
III.	Affections of the Nervous System and Organs of Senses ...	7,738	5.78
IV.	Affections of the Circulatory System ...	900	0.67
V.	Affections of the Respiratory System ...	10,929	8.17
VI.	Diseases of the Digestive System ...	42,293	31.60
VII.	Diseases of the Genito-Urinary System (non-venereal)	4,145	3.10
VIII.	Puerperal State ...	79	0.06
IX.	Affections of the Skin and Cellular Tissue ...	29,537	22.07
X.	Diseases of the Bones and Organs of Locomotion (other than Tuberculosis) ...	1,797	1.34
XI.	Malformations ...	2	0.00
XII.	Diseases of Infancy ...	42	0.03
XIII.	Affections of Old Age ...	188	0.14
XIV.	Affections Produced by External Causes ...	9,239	6.90
XV.	Ill-defined Diseases ...	2,188	1.64
		133,836	100.00

As compared with the previous year, the percentage for Group I has increased from 12.43 to 15.9, and for Group VI from 28.27 to 31.6 owing to a larger proportion of cases of malaria, yaws and ankylostomiasis. The counter-balancing decrease occurs chiefly in Group IX, which has fallen from 28.39 to 22.07. Of the remaining Groups, the percentages for the two years correspond very closely.

1. General Diseases.

General Diseases not included in Group I.—Of the 3,484 cases treated, chronic rheumatism accounts for 2,392, anæmia and chlorosis for 409 and diseases of the spleen for 431. Nineteen cases of cancer (15 Africans and 4 Asiatics) are recorded as compared with eleven in 1927 and six in 1926. Of non-malignant tumours, the most commonly met with are cysts and adenomata.

Affections of the Nervous System and Organs of the Senses.—Most of the cases in this Group consist of headache and minor ear

and eye affections. As compared with the previous year, serious conditions were returned as follows:—

		1927.	1928.
Meningitis	...	3	3
Locomotor Ataxia	...	16	8
Myelitis	...	1	2
Spastic Paraplegia	...	1	1
Apoplexy and Paralysis	...	103	83
Epilepsy	...	25	13
Cataract	...	162	173
Mastoiditis	...	6	21

Affections of the Circulatory System.—Lymphangitis and lymphadenitis constitute 610 of the 900 cases in this Group. These, for the most part, are undoubtedly of filarial origin and would be more correctly shown under Mosquito-borne Diseases. Two cases of arterio-sclerosis and six of pericarditis are recorded as compared with one and two respectively in 1927. On the other hand, the number of cases of mitral disease has decreased from 62 to 46, and of myocarditis from 32 to 15. No case of aneurism occurred as compared with five in the previous year.

Affections of the Respiratory System.—Under this heading, 10,929 cases were treated as compared with 8,165 in 1927 and 6,111 in 1926. The numbers for the more important affections compare with the two previous years as follows:—

	1926.	1927.	1928.
Bronchitis	4,945	6,736	8,785
Broncho-Pneumonia	27	76	10
Pneumonia	195	175	150
Pleurisy	36	114	80

Of the above, 19 cases (broncho-pneumonia 3, pneumonia 16) ended fatally as compared with 22 in 1927.

Diseases of the Digestive System.—The number of cases in this Group increased from 30,299 in 1927 to 42,293, and represents 31.6 per cent of all cases treated during the past year. Of the different diseases, ankylostomiasis (*see* page 15) shows the greatest increase—from 10,618 to 16,944. Nineteen cases of appendicitis (one death) and sixteen of peritonitis (six deaths) occurred as compared with seven (no deaths) and eight (two deaths) respectively in 1927. Of 396 cases of hernia, 31 were recorded as femoral, 337 inguinal, 12 umbilical and 16 strangulated. In 1927, hernia cases in all numbered 397, of which 127 were admitted to hospital and nine terminated fatally as compared with 142 admissions and five deaths last year.

With the exception of those mentioned above, the diseases in this Group are for the most part minor affections of the digestive tract. Somewhat disturbing reports have been received concerning the unsatisfactory condition of the teeth of the natives generally

throughout the Protectorate. The cases of dental caries numbered 4,316, but this is thought to be little indication of the extent to which dental treatment is required. Dr. Pitchford, in his report on the District Dispensaries in Zanzibar Island, writes: "518 dental extractions were performed, but for every tooth extracted there were at least two more which should have been removed. Oral sepsis is an increasing and important cause of disability among the people". With regard to Pemba, Dr. McCarthy writes: "Dental caries is very common and is probably a direct cause of the very prevalent gastric trouble, as often the mouths are nothing but septic fœtid cavities". It is hoped that the Dental Surgeon on one of his periodical visits during the coming year will be able to investigate and advise as to what, if any, action can be taken.

Diseases of the Genito-Urinary System (non-venereal).—There is little doubt that many of the cases shown in the District Dispensary returns under this heading are actually venereal in origin. As compared with the previous year, the number of cases of nephritis has increased from 60 to 116, of schistosomiasis (*see* page 15) from 600 to 823, of orchitis from 379 to 521 and of hydrocele from 513 to 548. The hydrocele cases are thought for the most part to be of filarial origin; 212 were admitted to hospital in 1928 and 177 in 1927, four each year terminating fatally.

Puerperal State.—It is satisfactory to note that no deaths occurred among the 79 cases recorded as against 63 cases and three deaths in the previous year.

Affections of the Skin and Cellular Tissues.—Next to digestive diseases, this is the largest Group with 29,537 cases, representing 22.07 per cent of all cases treated. In 1927 the number of cases was 30,427 with a percentage of 28.39. This comparison is of special interest since the decrease is due to a great reduction in the proportion of ulcer cases and is an indication that the natives are learning to appreciate the value of the early treatment provided by the district dispensaries for minor injuries. Of other affections, 13 cases of gangrene and 14 of carbuncle are recorded as compared with 17 and 10 cases respectively in the previous year. On page 85, Section IX, notes on an interesting case of gas gangrene are contributed by Dr. McCarthy.

Diseases of Bones and Organs of Locomotion (other than Tuberculosis).—In this Group, myalgia 513, lumbago 476, arthritis 246, synovitis 224 and osteitis and osteo-myelitis 50, constitute most of the cases.

Affections Produced by External Causes.—Of the 9,239 cases treated, 429 necessitated admission to hospital and 13 proved fatal. In the previous year there were 7,999 cases, 336 admissions and 18 deaths.

Ill-Defined Diseases.—This Group consists chiefly of cases of general debility, œdema and undefined fever, for the most part due to ankylostomiasis, filariasis and malaria.

2. Communicable Diseases.

(a) *Mosquito or Insect-Borne.*

Malaria.—The total number of cases of malaria treated during the year was 8,252 as compared with 5,714 in 1927 and 4,808 in 1926. The following table shows the number of cases treated at each station during the three years:—

Stations.	Cases treated.		
Zanzibar Island.	1926.	1927.	1928.
Zanzibar	1,985	1,307	2,564
Selem	87	119	247
Mkokotoni	129	261	283
Mwera	149	287	427
Chwaka	97	171	132
Mbiji	158	86	110
Machui	209	324	230
Mahonda	192	146	246
Mangapwani	65	144	334
Kizimkazi	115	98	120
Bweleo	6	39	174
Tunguu	6	104	151
Walezo	—	192	297
Bububu	—	238	197
Uzini	—	107	293
Chaani	—	—	114
Pemba Island.			
Weti	305	305	348
Chake Chake	453	628	715
Mkoani	414	336	322
Kengeja	91	182	193
Matangatwani	41	105	139
Jambangome	99	185	190
Tumbe	65	60	17
Fufuni	46	85	63
Tundaua	40	67	34
Stambuli	32	35	105
Mzambaraoni	13	60	40
Ole	11	43	25
Road Construction Camps	—	—	142
Total	4,808	5,714	8,252

The percentage of cases of malaria to all cases treated for the past five years was as follows:—

1924.	1925.	1926.	1927.	1928.
7.46	6.75	6.27	5.33	6.16

The increased number of cases in Zanzibar town and other stations and the higher percentage shown by the above figures do not imply any greater incidence of malaria. That the increases are due wholly to more accurate diagnosis is supported by the fact that the returns for 1928 show only 936 cases of pyrexia of uncertain origin as compared with 2,650 cases in 1927.

The deaths in Zanzibar town, returned as due to malaria, numbered 76, a considerable reduction on the numbers for previous years, which were 131 in 1923, 155 in 1924, 226 in 1925, 216 in 1926 and 139 in 1927.

It is of interest to note that in Zanzibar island not only the laboratory and hospital returns, but also the less accurate district dispensary returns for the past two years, record a considerable excess of tertian over sub-tertian cases. In previous years it was usual to find sub-tertian cases in excess. In an exhaustive investigation undertaken by Dr. Mansfield-Aders during 1925 it was found in a large number of blood films of native children that tertian films outnumbered sub-tertian by more than two to one. The laboratory returns for last year (*see* page 82) show the proportion as five to one, and there seems little doubt that year by year in Zanzibar town and island the tertian type is becoming more predominant.

With regard to Pemba island, in the northern portion, Dr. McCarthy's returns show a large excess of tertian, both for patients and native children. In the southern portion, on the other hand, the returns record sub-tertian in excess, and of 265 positive malaria blood films examined by Dr. Austin at Chake Chake (*see* page 84) 92 contained tertian and 173 sub-tertian parasites.

Dr. Aders, in his 1925 investigations, found that 7.9 of the children examined harboured quartan parasites, but this variety is rarely demonstrated in the blood of adult hospital patients, and the laboratory returns show them found in only four of 1,148 positive malarial films.

Blackwater Fever.—Fifteen cases with three deaths occurred during the year. These figures compare with those for the seven previous years as follows:—

	1921.	1922.	1923.	1924.	1925.	1926.	1927.	1928.
Cases	5	9	6	4	3	9	3	15
Deaths	1	1	2	2	1	2	0	3

A death from this disease was also recorded by a private medical practitioner.

The following is a summary of the information obtained from the records of the fifteen cases treated by Government Medical Officers.

Sex.—All males.

Age.—10, 18, 20, 20, 23, 26, 28, 28, 28, 32, 35, 37, 38, 40, 41.

Race.—British Indian 6, Goan 3, English 2, Chinese 2, Seychellian 1, Comorian 1.

Occupation.—Nine were employed in Government service, one as police officer, one as road foreman, one as police inspector, five as clerks and one as blacksmith. Of the six non-officials, two were clerks, one a trader, two (Chinese) engaged in collecting bêche-de-mer, and one a child.

Locality.—Ten contracted the disease in Pemba and five in Zanzibar island. Of the Pemba cases, five were living in Chake Chake, one in Weti, one in Mkoani and three in the districts. Of the five Zanzibar cases, one resided at the Ziwani police lines, one at Mkokotoni, one arrived from the mainland only on the previous day, and two (the Chinese) had no fixed abode.

Period of residence.—Most of the patients had lived in the Protectorate for several years; one, however, for only five months, but had previously resided in Uganda, where also he had had an attack of blackwater fever.

Previous attacks of malaria.—Numerous in all cases.

Previous attacks of blackwater fever.—Four patients stated they had each had one previous attack.

Seasonal incidence.—Two cases occurred in March, one in June, four in July, two in August, two in September, one in October, one in November and two in December.

Cause of attack.—In all cases, where a reliable history was obtainable, the patient had suffered from numerous attacks of malaria and had been negligent in taking quinine in adequate quantities or for a sufficiently long period.

It will be noted, although the number of cases is the largest recorded for several years, that only one patient, residing at Ziwani near the boundary, contracted the disease in Zanzibar township. Nine of the fifteen cases occurred in the southern portion of Pemba, where, as stated, the subtertian parasite is predominant. Some drainage has been undertaken at Chake Chake during the year and a reduction in mosquitoes and malarial cases has been reported, but much still remains to be done here and at other out-stations before the position can be considered satisfactory.

Dengue.—Only three cases are recorded.

Filariasis.—Under this head 304 cases are shown in the returns as compared with 217 in 1927 and 102 in the previous year. These figures, however, do not include the many serious conditions ascribed to be chiefly of filarial origin, such as lymphadenitis, lymphangitis, hydrocele and elephantiasis, of which respectively 425, 185, 548, and 247 cases are recorded.

(b) *Infectious Diseases.*

The following table shows the number of cases with deaths of the more important infectious diseases treated during the year as compared with the two previous years:—

	1926.		1927.		1928.	
	Cases.	Deaths.	Cases.	Deaths	Cases.	Deaths.
Enteric Group	8	1	17	1	6	3
Small-pox	53	15	50	19	2	—
Whooping Cough	52	1	64	—	265	—
Influenza	847	—	1,453	—	767	—
Mumps	17	—	117	—	38	—
Dysentery	93	1	100	12	225	4
Leprosy	37	—	26	—	16	—
Chicken-pox	32	—	38	—	21	—
Yaws	1,066	—	2,086	—	6,698	—
Tetanus	9	4	1	1	4	3
Tuberculosis	175	9	219	52	284	39
Syphilis	383	—	531	7	931	2
Soft Chancre	356	—	528	—	431	—
Gonorrhœa	1,459	—	2,153	—	2,660	—

Enteric Group.—The cases treated and deaths during the past three years were as follows:—

	1926.		1927.		1928.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Typhoid Fever	3	—	2	—	—	—
Paratyphoid A	—	—	1	1	—	—
Paratyphoid B	5	1	13	—	6	3
Type undefined	—	—	1	—	—	—

In addition to the above, the following were notified by private practitioners in Zanzibar town:—

	1926.		1927.		1928.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Typhoid Fever	1	—	3	1	2	1
Paratyphoid B	—	—	4	—	2	—

Of last year's cases, one occurred in Weti, one at Walezo Poor House and the remainder (one in the Central Prison) in Zanzibar town.

Small-pox.—The two cases shown in the returns were removed from a Bombay steamer. No case has originated in the Protectorate since October 1927, when the last epidemic of about a year's duration came to an end.

Whooping Cough.—The table shows a considerable increase in the number of cases over previous years. Of the 265 cases treated, 255 occurred in Zanzibar island and only 10 in Pemba. No deaths are recorded among these, but one death in Zanzibar town was notified by a private practitioner.

Influenza.—The disease was of a mild type and no deaths occurred among 767 cases treated. Only three deaths in Zanzibar town were notified as compared with 13 in 1927 and 40 in 1926.

Dysentery.—More than double the number of cases, but only four deaths as compared with 12 in the previous year, are returned under this heading. Of last year's cases, 174 occurred in Zanzibar island (129 in Zanzibar town) and 51 in Pemba. Nearly half the cases are returned with the cause undefined, and there is little doubt that many would more correctly come under the "Diarrhœa and Enteritis" heading. Of deaths during the year in Zanzibar town, 27 were notified as due to dysentery compared with 18 in 1927 and 66 in 1926. Most of these are also returned with the cause undefined and many are probably due to intestinal tuberculosis. Of cases treated returned with cause defined, 113 are ascribed to bacillary and 11 to amœbic; of deaths in Zanzibar town nine to bacillary and five to amœbic. Of specimens examined at the laboratory from 12 different patients, eight were bacillary and four amœbic, and from two patients, on one occasion the cause was bacillary and on another amœbic.

Leprosy.—Only 16 cases were notified as compared with 26 in 1927 and 37 in 1926. It is feared that the decrease is rather due to concealment than to a reduced incidence. The report on the Funzi Island Leper Settlement will be found on page 105 (Appendix II).

Yaws.—The district dispensaries in Zanzibar island account chiefly for the large increase in the number of cases treated. In Zanzibar island the cases numbered 4,748 and in Pemba 1,950. In former years Pemba has always supplied the greater number, and it was thought the disease was more prevalent in that island. The establishment of district dispensaries throughout Zanzibar island has, however, made it necessary to modify this view. The efficacy of treatment by injections of Sodium Potassium Bismuth Tartrate is fully recognized by the natives, but, as pointed out by the Resident Surgical Officer (Dr. Vassallo) in an interesting paper read at the 1927 Imperial Social Hygiene Congress, the dramatic results achieved by one or two injections too readily satisfy the patients and recurrences within a short period are common. Further injections, however, appear to effect a permanent cure, and it is hoped in the course of a few years that this disease, as has become so noticeable in the case of large ulcers, will soon lose its prominence.

Tetanus.—All four cases occurred in Zanzibar island, no case being reported from Pemba. One death was also notified in Zanzibar town by a private practitioner.

Tuberculosis.—The returns relating to this disease continue unsatisfactory. As shown on the Table on page 13, there has again been a considerable increase in the number of cases treated. The deaths in Zanzibar town ascribed to tuberculosis are also more numerous, the numbers for the last ten years being as follows:—

1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	1927.	1928.
148	125	105	163	185	167	132	145	138	190

One of the deaths last year was returned as due to tuberculosis of the central nervous system, and all the remainder as due to pulmonary tuberculosis.

Of the cases treated, 265 were pulmonary and 19 tuberculosis of other organs. From Zanzibar island 234 cases were recorded (Zanzibar town 114, districts 120) and from Pemba 50 (Chake Chake 33, Weti 8, Mkoani 6, districts 3). Dr. Austin (Medical Officer, Chake Chake) draws attention to the steadily increasing prevalence of the disease in Pemba.

No satisfactory measures for dealing with the tuberculosis problem have as yet been discovered. Investigations, however, indicate that any practicable form of sanatorium treatment would be altogether unpopular and thus defeat its purpose. A clinic established some years ago met with no success owing to lack of support, but it is hoped during the coming year to make a new effort in this direction.

Venereal Diseases.—Few natives escape one or other of these diseases, and the increased number of cases merely indicates that more are taking advantage of the treatment offered.

(*c*) *Helminthic Diseases.*

The number of cases treated of the more important helminthic diseases during the year as compared with the two previous years was as follows:—

	1926.	1927.	1928.
Ankylostomiasis	9,222	10,618	16,944
Filariasis	102	217	304
Schistosomiasis	420	600	823
Ascariasis	17	77	178

The usual yearly increase is therefore maintained for each disease. This, in the case of ankylostomiasis, does not indicate an increased incidence, since the investigations of Dr. Aders have confirmed the opinion held for many years that practically the whole native population has long been infected. So far, it has been possible to undertake little in the way of preventive measures, and any beneficial effects derived from treatment are therefore only temporary. A clause in a Public Health Bill now before the Legislative Council requires the provision of an approved form of latrine for all newly erected dwellings, and if, as is hoped, this comes into force during the coming year, some definite and permanent improvement in the present position may be anticipated, since the average life of a native-built house is probably only about ten years. Meanwhile, the greatly increased number of ankylostomiasis cases treated must be considered satisfactory since each patient treated not only benefits himself but becomes a less potent source of infection to others.

On the other hand, the increase in schistosomiasis cases signifies, there is little doubt, an increased incidence. Until a few years ago the cases were comparatively few and as these occurred chiefly, if not

solely, among natives who had resided on the mainland, some doubt existed whether any infection had occurred within the Protectorate. Since then, as the number of cases increased year by year and were reported from nearly all district dispensaries in both islands, it soon became evident that numerous endemic centres existed, but until recently the intermediate host remained undiscovered. The investigations undertaken by Dr. Aders during the past two years have however, not only determined the prevalence of the fresh water snail Isodora ovoidea throughout the Protectorate, but also succeeded in clearly implicating it in the conveyance of this disease. Thanks to this important discovery, it is hoped during the coming year to be able by propaganda and other measures to attack the problem with some measure of success.

Reference to filariasis has already been made under "Mosquito and Insect-borne Diseases", page 12.

Under Section IX, Scientific, will be found the report of Dr. Aders on his investigations, continued from the previous year, into the helminthic diseases of the Protectorate. Under the same Section are also included reports by Dr. McCarthy on some investigations undertaken in the Weti District of Pemba and an interesting experiment demonstrating the beneficial effects of an improved diet in the treatment of ankylostomiasis.

(B) VITAL STATISTICS.

1. General Native Population.

A census taken in 1924, showed an Arab and African population of 202,665 for the whole Protectorate. The number of non-natives was at the same time estimated approximately at 15,300, making a total population of 217,965.

Since the census was taken, the returns to the end of last year show an excess of immigrants over emigrants of 2,038 and of deaths over births of 1,018, representing an increase of 1,020 in total population. These returns, however, do not specify the different races, and although the registration of births and deaths is compulsory there is reason to believe that many births in the districts are left unrecorded. Taking all factors into consideration, it is probable that any increase in population is chiefly non-native and that the native population remains much the same as in 1924, any loss due to an excess of deaths over births having been made good by immigration. Table III on page 90 contains the birth and death statistics for the past and previous six years. From these it will be noted that last year, as usual, there was an excess of births in Pemba and an excess of deaths in Zanzibar island. For the whole Protectorate, the number of deaths exceeded the births by 66, which, although still unsatisfactory, is some improvement on previous years, with the exception of 1927. The statistics for 1927, however, were abnormal in that they benefited from a very heavy mortality in the previous year among the aged and infirm due to an influenza epidemic.

Based upon the estimated population and the birth and death returns, the crude rates per 1,000 for the past three years were as follows: —

	1926.	1927.	1928.
Birth Rate	17.65	21.98	19.34
Death Rate	23.10	19.06	19.64

Zanzibar Township.—For Zanzibar township any birth statistics are invalidated by the custom, referred to in previous reports, of women going into the district for their confinements. The number of births registered last year, however, is the highest on record, and consisted of nine European, 38 Arab, 382 Asiatic (excluding Arab) and 97 African.

The number of deaths in the township was 1,093, or nearly 140 under the average for the previous ten years, and there is little doubt, if such factors as increased population and the number of deaths of non-residents in hospital could be accurately estimated, that a very definite reduction in the death rate would be disclosed.

Of the deaths, one was European, 119 Arab, 273 Asiatic (excluding Arab) and 700 African.

The causes of death shown in the return on page 92 can be taken as only approximately accurate, only 322 of the total having been registered by qualified medical practitioners. For the remainder, consisting of 85 Asiatic and 686 Arab and African, the cause was determined as correctly as possible by examination of the body and information derived from relatives and other sources. Some of these had received treatment during part of their last illness as out-patients at one or other dispensary, but by far the greater number had remained content with native medicines and incantations. Unfortunately, no staff has so far been available to carry treatment for natives into their own homes. It is hoped, however, that this serious defect may before long be supplied to some extent by making such treatment part of the training of native dispensers.

Reference has already been made under Infectious Diseases to the unsatisfactory increase in deaths from tuberculosis in the township. The deaths ascribed to ankylostomiasis have also increased to 50 as compared with 22 in the previous year. On the other hand, the number of deaths from malaria shows a decrease from 139 to 76.

2. General European Population.

The total number of cases among Europeans treated during the year at Government hospitals and dispensaries was 578, and two deaths occurred. Of these 294 cases and one death were among non-officials, the more important diseases being malaria 44, dysentery 5, endocarditis ending fatally 1, bronchitis 7, diarrhœa and enteritis 18, appendicitis 3, nephritis 1 and salpingitis 1.

During the previous year the cases numbered 574 with two deaths, and of these 257 cases and both deaths were among non-officials.

Nine births occurred during 1928.

3. European Officials.

The cases treated among European officials numbered 284 with one death due to cardiac failure. Of other illnesses the more important were blackwater fever 2, malaria 45, dysentery 2, appendicitis 1, diabetes 1, and influenza 9.

For fifteen illnesses the patients were admitted to hospital and for 104 placed off duty, the total number of days off duty being 524. Of the total number of illnesses, 71 occurred in Pemba and 213 in Zanzibar island. The greater prevalence of sickness in Pemba is shown by the figures for the average number of days off duty to the average number of officials resident being 8.31 for Pemba and 5.29 for Zanzibar. Twenty-nine cases of malaria occurred in Zanzibar island as compared with 16 in Pemba.

One case of blackwater fever occurred in each island.

Only one Medical Board was held during the year, resulting in a recommendation for the transfer of the official to a more healthy climate.

The following table shows the Sick, Invaliding and Death Rates for the whole Protectorate as compared with those for the two previous years:—

		1926.	1927.	1928.
Total number of officials resident	...	128	112	127
Average number resident	...	99.8	99.25	89.96
Total number on sick list	...	140	91	104
Total number of days on sick list	...	516	553	524
Average daily number on sick list	...	1.41	1.51	1.43
Percentage of sick to average number resident	...	1.41	1.52	1.59
Average number of days on sick list for each patient	...	3.68	6.08	5.04
Average sick time to each resident	...	5.17	5.57	5.82
Total number invalided	...	2	3	1
Percentage of invalidings to total residents	...	1.56	2.67	.79
Total deaths	...	—	—	1
Percentage of deaths to total residents	...	—	—	.79
Percentage of deaths to average number resident	...	—	—	1.11

4. Non-European Officials.

All non-European officials, consisting of 443 Asiatics and 109 Arabs and Africans of the 4th and higher Grades, are included under this head.

During the year 772 cases of illness were treated, for 420 of which the officials were placed off duty, 85 were admitted to hospital and two deaths occurred. In the previous year 1,045 cases were treated, 445 placed off duty, and 101 admitted to hospital with two deaths.

Twelve Medical Boards were held during the year and ten officials were permanently invalided as compared with six in the previous year. The causes of invaliding were:—

Chronic Malaria and Debility	2	Myocarditis	1
Tuberculosis	2	Chronic Nephritis	1
Neurasthenia	1	Elephantiasis	1
Mental Derangement	1	General Debility	1

The following table shows the Sick, Invaliding and Death Rates for the past and two previous years:—

	1926.	1927.	1928.
Total number of officials resident ...	574	516	552
Average number resident ...	497.22	491.67	458.95
Total number on sick list ...	569	445	446
Total number of days on sick list ...	3.384	2,495	2,959
Average daily number on sick list ...	9.27	6.83	8.08
Percentage of sick to average number resident ...	1.86	1.39	1.76
Average number of days on sick list for each patient ...	5.95	5.61	6.63
Average sick time to each resident ...	6.80	5.08	6.45
Total number invalided ...	6	6	10
Percentage of invalidings to total residents ...	1.05	1,16	1.81
Total deaths ...	3	2	2
Percentage of deaths to total residents ...	0.52	0.39	0.36
Percentage of deaths to average number resident ...	0.60	0.40	0.43

Of the two deaths, one was due to blackwater fever and one to carcinoma of the liver.

The more common illnesses were malaria 232, blackwater fever 6, influenza 52, dysentery 7, respiratory diseases 83, digestive diseases 107, skin and cellular tissue diseases 53, injuries 36.

In the previous year there were 303 cases of malaria, but only three cases of blackwater fever.

5. Police Force and Prison Staff.

The total strength of non-commissioned officers and men of the Police Force and Prison Staff for the year under review was 640, with an average strength of 583. In all 3,354 cases of illness were treated, for 812 of which the patients were placed off duty and 203 admitted to hospital. The total number of days off duty amounted to 3,714, averaging 5.8 days for each policeman and warder.

Four deaths occurred during the year and nine men were discharged medically unfit as compared with five deaths and eighteen invalidings in 1927.

The causes of death and invaliding were as follows:—

Deaths.		*Invalidings.*	
Pulmonary Tuberculosis	1	Tertiary Syphilis	1
Diabetes	1	Pulmonary Tuberculosis	1
Ankylostomiasis	1	Neurasthenia	2
Unknown*	1	Chronic Cephalalgia	1
		Defective vision	1
		Beri-Beri	1
		Neuritis	1
		Perforating ulcer	1

Ziwani Police Lines.—The average number of the Force resident in the Ziwani Lines was 365 and the cases treated numbered 2,338 with 6,262 re-attendances. For 643 illnesses the patients were placed off duty, the total number of days off duty amounting to 2,248, the

*Death occurred while absent from the Protectorate on leave.

average number of the Force off duty each day owing to illness being 6.33. Admissions to hospital numbered 142 and three deaths occurred as recorded above.

The average number of women, children and other non-members of the Force living in the Lines during the year was 259, and among these the deaths of three children occurred, one from enteritis, one from chronic malaria and one from thrush and malaria.

The women and children for the most part seek treatment at Mwembeladu Dispensary or the Native Hospital, only 313 cases being treated at the Police Lines Dispensary.

Twenty births occurred in the Lines during the year.

District Police Lines.—Below is tabulated a summary of the more important returns relating to members of the Force resident at District Lines:—

	Zanzibar District.	Weti District.	Chake Chake District.	Mkoani District.
Average number resident	73	45	42	23
New cases treated	323	350	227	116
Number placed off duty	61	50	34	24
Total number of days off duty	563	573	261	69
Number admitted to hospital	18	12	28	3
Deaths	—	—	—	—
Invalided	—	—	—	—

Based upon the average number resident in Pemba and Zanzibar island, the return shows that on an average each member of the Police Force and Prison Staff received treatment on approximately six occasions, but was off duty for 8.2 days if stationed in Pemba and 6.4 days if stationed in Zanzibar island.

III. HYGIENE AND SANITATION.

Report by the Deputy Director of Sanitary Services.

(A) GENERAL REVIEW OF WORK DONE AND PROGRESS MADE.

The personnel of the Public Health Service remained the same as during 1927.

No epidemic of infectious disease occurred during the year.

The sanitation of Pemba was under the supervision of the Medical Officers and Sub-Assistant Surgeons, assisted by two Asiatic Sanitary Inspectors and three African Apprentice Sanitary Inspectors. The Medical Officers were also responsible for veterinary work, including meat inspection, control of slaughter-houses and cattle quarantine. In the middle of December a Veterinary Cadet was stationed at Chake Chake to carry out veterinary duties in the island.

The work done during the year is shown in detail under the appropriate headings.

1. Preventive Measures.

(*a*) *Mosquito and Insect-borne Diseases.*

Control over mosquito breeding continued to be exercised as detailed in previous reports, and, as in previous years, this control has been more effective in the case of Anopheles and Stegomyia than in that of Culex, owing to the greater accessibility of the breeding places of the two former genera. All premises in the town are inspected weekly, as are all district areas in and near the township which are likely to contain standing water.

In general, the measures taken against Stegomyia are the emptying of vessels containing or likely to contain larvæ: against Culex, oiling of cesspools, etc.; and against Anopheles, Paris Green or oil are used when temporary breeding places are found. There are no permanent Anopheline breeding places in the township.

In the prevention of malaria, anti-larval measures play by far the most important part, and a secondary place is taken by protection of individuals from the adult mosquitoes by the use of mosquito nets, etc. Prophylactic quinine is not usually taken by Zanzibar residents, and is not recommended. Anti-parasitic measures as a factor in the prevention of the disease are out of the question in a town with a large population of Africans who are all infected early in life and who, as adults, have acquired a tolerance to the parasite.

The only Anophelines found in the township as the result of house collections for adults (*see* Table No. 3) are A. costalis and A. funestus. Both these species have been shown to be naturally infected with malaria in Zanzibar. Their larvæ, and occasionally larvæ of A. mauritianus, are found in temporary breeding places in the township.

The anti-larval measures which have been adopted with a view to malaria control are the drainage of all permanent breeding grounds and also of the most important temporary ones. There are still many of these temporary places to be dealt with, particularly in the Mgombani-Kilimani area, but it is hoped that in 1929 most of the areas which are troublesome during the rains will be permanently dealt with by drainage or filling.

During 1928 it was found possible to use some of the funds provided for "Maintenance of Swamp Drainage" to replace a few small earth drains in the Kilimani-Mgombani area by permanent subsoil drains.

In Pemba a considerable amount of permanent anti-malarial drainage has been carried out at Chake Chake and Mkoani, in each of which large and more or less permanent swamps have been drained.

Table No. 1.

Comparative table showing collections of mosquito larvæ found in the township:

	1926.	1927.	1928.
Anopheline	39	31	67
Culex	204	484	287
Stegomyia	5,365	3,856	2,090

Table No. 2.

Analysis of breeding places of Anophelines found in the township in relation to the months of the year:—

	Temporary Pools.	Cement Drains.	Cement Tanks.	Wells.	Tins, Pots, etc.	Boats.	Total.
January	3	—	—	—	—	—	3
February	1	—	—	—	—	—	1
March	—	—	—	—	—	—	—
April	6	—	—	—	—	—	6
May	26	—	—	—	—	6	32
June	7	—	—	—	—	—	7
July	1	—	—	—	—	—	1
August	1	—	—	—	—	—	1
September	1	—	—	—	—	—	1
October	5	—	—	—	—	—	5
November	6	—	—	—	—	—	6
December	4	—	—	—	—	—	4
							67

Total breeding places 67

Table No. 3.

The following adult mosquitoes were caught in the township:—

	1926.	1927.	1928.
Anophelines	451	464	372
Culex	2,342	1,998	4,458
Stegomyia	128	258	382

Table No. 4.

Adult Anophelines were found in:—

	1927. Occasions.	1928. Occasions.
The Government Prisons	9	21
Ziwani Police Lines	6	16
Parsee Temple	4	13
Native Hospital	1	9
Malindi Police Station	—	7
U.M.C.A. Hospital	1	6
Gulioni Customs	—	4
European Hospital	—	4
Darajani Police Station	—	2
Mwembeladu Hospital	—	2
Kisimamajongo Police Station	1	2
Government School	—	1
Infectious Diseases Hospital	—	1
Mji Mpia	—	1
Private Houses	8	6

TABLE No. 5.

Sullage and cesspits oiled fortnightly during 1928.

January	1,929	July	2,182
February	2,147	August	2,024
March	1.328	September	2,137
April	1,966	October	2,005
May	2,146	November	1,701
June	2,138	December	1,903
		Total	23,606

	1926.	1927.	1928.
Number of notices served	150	1,520	968
Number of prosecutions instituted	2	16	13
Number of convictions obtained	2	16	13

As shown in Table 1, there was a considerable increase in the number of Anopheline larvæ found in the township, owing to the fact that intermissions in the rainfall were not marked and temporary collections of water, which in ordinary years would dry up before hatching of larvæ could take place or before the larvæ had grown sufficiently to make them easily found, were replenished before drying occurred.

With regard to collections of adult mosquitoes, more attention was paid in 1928 to ascertaining where mosquitoes could be found than to the total number captured, so that the figures for 1927 and 1928 in Tables 3 and 4 do not compare.

(*b*) *Epidemic Diseases.*

No epidemic of any infectious disease occurred in the Protectorate during the year.

Small-pox.—No cases were reported during the year. The last case of the epidemic of the years 1926 and 1927 occurred in October of the latter year, and since then the disease has for the time being completely disappeared. It is hoped that adequate protection of the population by vaccination, together with an efficient Port Health Service, will prevent recurrences of the serious outbreaks of this disease which have occurred with some frequency since the war.

Table No. 6.

The following table shows the number of Vaccinations carried out during the year:—

Months.	Town.	Steamers.	Dhows.	Mkoko toni.	Chwaka.	Weti.	Chake Chake.	Mkoani.	Total.
January	802	203	333	98	208	263	73	191	2,171
February	761	119	1,307	...	...	232	142	122	2,683
March	478	40	508	...	...	147	50	56	1,279
April	489	29	82	...	...	136	48	36	820
May	315	80	32	...	...	102	50	19	598
June	452	16	76	...	...	84	242	23	893
July	351	27	169	...	...	36	288	11	882
August	251	474	191	...	...	61	273	31	1,281
September	270	39	109	...	...	78	755	33	1,284
October	274	45	99	...	...	92	172	24	706
November	159	16	115	...	...	89	350	13	742
December	192	53	152	...	...	102	162	18	679
Total	4,794	1,141	3,173	98	208	1,422	2,605	577	14,018

Chicken-pox.—Twenty-one sporadic cases occurred, mostly in the township of Zanzibar.

Plague.—No cases of plague have occurred in the Protectorate since 1911, but the possibility of the introduction of this disease is not lost sight of, and regular and systematic rat destruction and examination is carried out throughout the year.

Particulars relating to rats destroyed will be found under Reduction of Vermin, Sub-section 7.

Tuberculosis.—This disease continues to account for more deaths than any other infectious disease in the town of Zanzibar, and to it were ascribed 17.4 per cent of the total number of deaths reported during the year.

Every effort is made by this department to remove the predisposing causes and aggravating conditions which enable this disease to flourish in the Protectorate, and more especially in Zanzibar town. But as improvement of housing conditions and reduction of overcrowding affect financially, to their detriment, the pockets of the local landlords, our efforts are far from popular with this very influential section of the community.

Legislation in support of the minimum requirements of modern sanitation has, however, been incorporated in the new Public Health Decree, which it is hoped will come into force early in 1929.

Enteric and Dysentery.—All cases of these diseases when diagnosed are isolated either in hospital or in their own houses. If the latter, detailed instructions as to the nursing of the case and the disposal of excreta are issued, and the necessary steps taken to prevent the spread of the disease. Subsequently the house is disinfected.

Leprosy.—This disease occurs mostly among the poorer and as a rule older members of the community, and practically always among those living in the country and but rarely among town dwellers.

Suspected cases are in the first instance examined bacteriologically and if positive are sent to Funzi Leper Settlement. Suitable steps are taken to deal with the belongings of patients to prevent spread of infection, and their affairs are settled by the District Officers.

Particulars concerning treatment and progress of lepers in Funzi Leper Settlement will be found in Appendix II.

(c) *Helminthic Diseases.*

(*a*) *Ankylostomiasis.*—This is one of the most prevalent diseases in the Protectorate, and shows an incidence of 93 per cent.

The most important preventive measures taken are the provision of cement-topped latrines and the dissemination of knowledge concerning the disease to school children and adults.

(*b*) *Schistosomiasis.*—The investigations of the Economic Biologist show this to be a common disease which is locally contracted.

2. General Measures of Sanitation, Zanzibar.

(*a*) *Sewage Disposal and Drainage.*—This remains the same as previously; many new drains have been constructed and twenty-nine cesspools abolished. The canalisation of the creek, to transform it into a large central cloaca, was commenced during the year. The completion of this undertaking should be a great improvement provided flushing with every tide is assured.

Drains.

	Public.			Private.		
	1926	1927	1928	1926	1927	1928
Masonry drains—						
Linear yards ..	No record	No record	13,952	No record	No record	No record
Linear yards constructed ..	1,546	916	1,943	982	7,595	1,883
Linear yards repaired ..	600	400	266	500	7,258	220
Storm water earth Drains—						
Linear yards ..	5,630	5,630	5,630	..	444	444
Linear yards cleaned and graded ..	15,910	358,515	371,625	..	..	888

Cesspools and Cesspits.

	1926	1927	1928
No. of cesspools and cesspits (approximately) ..	5,459	6,114	6,107
No. of cesspools and cesspits constructed ..	35	690	22
No of cesspools and cesspits abolished ..	27	38	29
No. of cesspools and cesspits cleaned ..	281	261	460

Public Latrines.

For Males.						For Females.					
No. of Latrines			No. of Seats.			No. of Latrines			No. of Seats.		
1926	1927	1928	1926	1927	1928	1926	1927	1928	1926	1927	1928
3	4	4	13	18	18	3	3	3	8	8	8

Two new latrines were in course of construction at the end of the year, and these will be fitted with independent automatic flushing to glazed squatting pans.

(*b*) *Refuse Disposal and Scavenging.*—This has been carried out as described in the 1926 report.

	1926	1927	1928
No. of men employed to remove refuse ...	191	191	191
,, ,, carts at work daily ...	53	53	54
,, ,, loads of refuse removed (daily average) ..	201	236	268
,, ,, ,, ,, ,, burnt ,, ,, ...	147	129	159
,, ,, ,, ,, ,, buried ,, ,, ...	54	107	109
,, ,, ,, ,, ,, dust and incombustible material	17	23	38
,, ,, dust bins provided ...	2,048	565	540

(*c*) *Water Supply.*—The water supply continues to be satisfactory; 66 samples were taken during the year.

	1926	1927	1928
PIPE-BORNE WATER:—			
Source	Spring	Spring	Spring
No. of linear yards	32,597	47,530	51,120
No. of standpipes along roads ...	49	78	78
No. of standpipes in compounds and houses	459	444	473
WELLS:—			
Public—			
Number	6	6	6
No. of pumps protected against surface water and mosquito-protected ...	...	...	...
Private—			
Number	83	82	82
No. with pumps protected against surface water and mosquito-protected ..	8	8	8
TANKS:—			
Public—			
No. underground	...	...	...
No. mosquito-protected and served by pumps	...	...	...
No. above ground	2	2	2
No. mosquito-protected	2	2	2
No. of 400 gallons capacity or less ...	...	...	...
No. above 400 gallons	2	2	2
Private—			
No. underground	5	5	5
No. mosquito-protected	5	5	5
No. above ground	408	408	408
No. mosquito-protected	159	160	160
No. of 400 gallons capacity or less ...	352	352	352
No. above 400 gallons	56	56	56
Nature of Tanks—			
Wood	...	...	...
Iron	158	158	158
Concrete	257	257	257
BARRELS:—			
Number	2,897	2,897	2,897
No. mosquito-protected	1,169	1,169	1,169
No. unprotected	1,728	1,728	1,728

(*d*) *Offensive Trades.*—Sites for offensive trades are urgently required. Lime burning, pottery work, and the storage of hides and copra continue to be carried on within the township. It is hoped that the completion of the wharf sheds and rules to be made under the new Public Health Decree will lead to a great improvement.

(*e*) *Clearance of Bush.*—This has been kept down by periodic cutting when necessary. The area cleared amounted in all to 59,860 square yards.

(*f*) *Sanitary Inspections.*—The following were inspected by the Director of Medical and Sanitary Services: Chwaka, Mkokotoni, Weti and Chake Chake.

The Deputy Director of Sanitary Services inspected Chwaka and Mkokotoni.

Weekly house-to-house inspections were made by the mosquito searchers.

The following table summarises the routine work of the Inspectors: —

	1926	1927	1928
No. of Sanitary Inspectors employed ...	5	6	6
No. of Junior Sanitary Inspectors employed ...	11	8	9
No. of visits to dwelling houses ...	285,703	455,384	511,678
,, ,, ,, hotels and bars ...	141	254	828
,, ,, ,, eating houses ...	1,241	4,570	4,715
,, ,, ,, lodging houses ...	724	3,179	3,722
,, ,, ,, aerated water factories ...	2 5	436	532
,, ,, ,, bake houses ...	223	312	445
,, ,, ,, foodstalls ...	1,420	2,463	3,577
,, ,, ,, cowsheds ...	802	2,857	991
,, ,, ,, godowns and garages ...	618	4,572	9,949
,, ,, ,, markets ...	1,460	991	1,564
No. of boats and dhows inspected for mosquitoes ...	784	8,014	6,113
No. of notices served to remove insanitary conditions ...	3,096	3,099	3,037
No. of notices not complied with at end of year ...	31	28	26
No. of nuisances abated ...	7,800	5,270	5,001
No. of convictions for not removing insanitary conditions ..	141	29	31
No. of houses cleaned and disinfected ...	20	9	5
No. of drains, tanks and barrels oiled ...	1,799	6,543	7,931
No. of W.C's installed ...	8	17	...
No. of cesspools emptied ...	218	261	334
No. of cesspools covered with cement concrete covers ...	100	112	130
No. of ruins cleaned out ...	250	259	82
,, ,, huts demolished ...	22	21	16
,, ,, paupers removed ...	115	121	103
,, ,, paupers buried ...	50	78	48
,, ,, lepers sent to Pemba ...	5	9	5
,, ,, cases of infectious disease removed to Isolation Hospital ...	15	24	6

3. School Hygiene.

The School Clinic, a modern building situated in proximity to the Government School and the Health Office and built on model lines, supplies treatment for children reporting sick from all Government and Government-aided schools in the town.

Routine examination of school children is carried out every six months and much good work has been done in the early diagnosis of disease.

The two most important functions of a school clinic, namely dental and eye examination and treatment, cannot unfortunately be carried out to the desired extent owing to lack of the necessary specialist personnel.

Dental treatment, it is true, is available, but only during the short periodic visits of the Tanganyika Territory Government Dentist; while eye work depends on the varying skill and interest of some temporary or permanent member of the Health Office.

The following table shows the most important defects discovered at routine examinations, and their relative distribution among the various races:—

	Arab.	Swahilis and others.	Indians.
	%	%	%
Lack of cleanliness	22	34	20
Defective teeth	38	32	47
Enlarged tonsils	27	20	24
Defective vision	9	7	8
Enlarged spleen	23	18	11
Parasitæmia	26	30	12
Defective nutrition	13	11	12

The total number subjected to routine examination during the year was 1,042, and 1,991 school boys attended the clinic for treatment, the average daily attendance being 34.

Chake Chake District.

Forty-nine school boys were examined in the Chake Chake district during the year. The following table shows the chief defects discovered:—

	Arabs.	Swahilis.	Indians.
Number examined	11	37	1
Lack of cleanliness	—	27%	—
Defective teeth	27%	17%	—
Enlarged tonsils	27%	48%	100%
Enlarged spleen	90%	68%	100%
Parisitæmia	36%	57%	—
Hookworm infection	82%	78%	100%
Defective nutrition	36%	24%	—

Weti District.

Seventy-six school boys were examined in the Weti District with the following results:—

Weti School.

Total number examined 58.

No. positive for Ankylostome	... 48	or 82 %
No. positive for Ascaris	... 11	or 18.96%
No. positive for T. trichuris	... 28	or 48.27%
No. positive for Malaria	... 19	or 32.89%
No. positive for Micro-filaria	... 9	or 15.52%
No. positive for Bilharzia	... 18	or 31.04%

Matangatwani School.

Total number examined 18.

No. positive for Ankylostome	... 18	or 100 %
No. positive for Ascaris	... 4	or 22.23%
No. positive for T. trichuris	... 11	or 61.12%
No. positive for Malaria	... 7	or 38.88%
No. positive for Micro-filaria	... 3	or 16.66%
No. positive for Bilharzia	... 10	or 55.56%

Weti:—Average age, 9.84 years.

Matangatwani:—Average age, 9.56 years.

4. Labour Conditions.

As previously pointed out, labour in this Protectorate is, for all practical purposes, entirely agricultural. It varies in numbers and in locality according to the season, and is largely imported from the mainland.

The temporary nature of concentrations of labour in any particular place makes it impossible to demand such conditions of housing and general hygiene as would be required in permanent labour camps, and little more is done than the supply of such medical aid as may be afforded by the proximity of a district dispensary.

5. Housing and Town Planning.

New native residential areas continue to open up, and the overcrowding in congested areas is gradually diminishing.

	1926.	1927.	1928.
Total number of houses, Zanzibar Township ...	3,351	3,354	3,351
Number occupied by Europeans ...	136	137	135
Number occupied by Natives and Asiatics	3,212	3,217	3,216
Number of huts ...	8,112	8,742	8,200

6. Food in Relation to Health and Disease.

(*a*) *Inspection and Control.*—The Sanitary Inspectors frequently examine foodstuffs in shops. During the year 27 lots or articles of food were seized and condemned.

(*b*) *Markets, Zanzibar Town.*—The control of the markets continue as previously reported.

(*c*) *Dairies.*—The unsatisfactory condition of the drainage system at the Government Dairy remains unchanged, but work is to be undertaken during the coming year by which it is hoped considerable improvement will be effected.

Practically all the milk brought into the town by native vendors is now tested by lactometer at the Milk Depôt in the market, where milk from the Government Dairy is sold. Nine samples were submitted for analysis.

(*d*) *Aerated Water Factories.*—All the aerated water factories were regularly inspected during the year, and thirty-five samples were submitted for analysis.

(*e*) *Slaughter-House.*—The control of the slaughter-house and inspection of meat remain as previously reported.

7. Reduction of Vermin.

(*a*) *Rats.*

Three grains of Barium Carbonate and Common Sense rat poison baits were again used throughout the year.

	1926.	1927.	1928.
No. of trappers employed ...	8	7	7
Rats trapped ...	16,654	18,739	19,569
Rats purchased ...	3,944	3,605	245

	Rattus rattus.	Mus norvegicus.	Pachyura cærulea.	Mus musculus.	Cricetomys gambianus.
1926	18,500	477	1,389	58	174
1927	20,992	51	1,172	..	120
1928	17,415	1,711	665	..	23

(*b*) *Flies.*

Three hundred and seventy-six breeding places were found and treated.

(*c*) *Pariah Dogs.*

Poison baits were set on one occasion and 35 dogs destroyed.

8. Extracts from Reports on Hygiene and Sanitation by Sanitation Officers, Pemba.

Chake Chake and Mkoani Districts.

The Medical Officer, Chake Chake, performed the duties of Sanitation Officer for these districts.

Chake Chake.

The Staff consisted of an Asiatic Sanitary Inspector, one Junior or one Apprentice Sanitary Inspector, two Mosquito Searchers, one Poor Attendant, eighteen sweepers, six special gang boys and one headman.

1. Preventive Measures

(*a*) *Mosquito and Insect-borne Diseases.*

With a view to removing one of the most prolific anopheline breeding areas in Chake Chake, about 1,700 feet of the Chachani Ditch was drained by an open concrete channel provided with lateral weep holes. The Chachani Ditch is 2,000 feet long and on completion of this work a marked reduction in the number of malaria cases in this area of the township is anticipated. Previously the "Ditch" consisted of a series of interrupted pools of water, difficult to drain and expensive to oil.

Mosquito nuisances found, numbered 110 as compared with 206 in 1927. It is possible that the marked reduction was the result of co-operation on the part of the inhabitants, but more probably it was due to the fact that less efficient control was exercised.

(*b*) *Epidemic Diseases.*

Small-pox.—No cases of small-pox occurred in the district. Vaccinations numbered 2,605 as compared with 1,420 in 1927.

Leprosy.—Three new cases were sent to Funzi. In November, the Pujini Settlement was closed and the 21 occupants transferred to Funzi.

Tuberculosis.—The number of cases recorded is steadily increasing, and steps to deal with this disease become more necessary year by year.

(*c*) *Helminthic Diseases.*

Ankylostomiasis.—No preventive measures were undertaken during the year.

Bilharziasis.—No experimental work has been undertaken to confirm the suspected centres of infection. It is hoped that propaganda in connection with the prevention of this disease will be undertaken in the schools during the coming year.

2. General Measures of Sanitation.

Sewage Disposal and Drainage.—No change.

Public and Private Latrines.—No change.

Refuse Disposal.—Dust bins are distributed throughout the township. Once or twice daily the rubbish is collected and removed to the incinerator. On occasions, during the rains, when the inciner-

ator was not capable of dealing with the large amount of rubbish collected, it was necessary to deposit unburnt garbage in the creek. The sweeper staff was augmented by six men during the year and the number of cart loads of rubbish removed shows a considerable increase:—

		1927.	1928.
Cart loads	...	1,473	3,177

Water Supply.—No alteration in source. An attempt has been made to augment the township supply by joining up the low level tank with an adjacent sump used some years previously as a supply tank. For many years this water, to the extent of 24,000 gallons daily, has been allowed to flow into the creek. The new scheme does not at present permit the utilisation of the whole amount available.

One interesting result of the flooding which occurred while the alterations were under construction, was the changing of the type of Anophelines found in the locality from A. maculipalpis and A. mauritianus to A. costalis.

Clearance of Bush.—About 105,375 square yards of bush were cleared. More sweepers were available during the year to assist the six special gang boys permanently employed on this work.

Sanitary Inspections.—

No. of houses inspected	...	9,529
No. of general nuisances found	...	54
No. of mosquito nuisances found	...	110
No. of sullage pits oiled weekly	...	43
No. of choo pits oiled weekly	...	53
No. of pariah dogs destroyed	...	180
No. of milk samples examined	...	23

3. School Hygiene.

Forty-nine pupils were examined. The results of the examinations will be found on page 29. School children were treated for 252 illnesses, chiefly malaria, ankylostomiasis, ulcers, and minor injuries.

4. Labour Conditions.

Two native dispensers were attached to road construction camps on the Chake Chake—Mkoani Road. The camps were visited from time to time by the Medical Officer. The health of the labourers was satisfactory.

Mkoani.

Drainage.—During the year the work of draining the swamp to the south of the township was commenced. As the area to be drained is extensive, the proposed scheme will not be completed until 1929. In addition, a saucer-shaped cement channel, 420 feet long, to carry off storm water was constructed on the south side of the main street. This drain functioned excellently during the rain, and the usual flooding of shops and houses did not occur.

Sewage Disposal.—During the year a public latrine was constructed. Similar accommodation has been provided at the Police Lines and School.

European, Indian and Native Houses.—As recorded in 1927.

Refuse Disposal.—One incinerator, which is adequate to deal with the refuse collected except during the rains, was in use.

Water Supply.—Ten additional rain-water tanks were constructed during the year. These are attached to Government Quarters. So far it has not been possible to provide an adequate supply of water for the general population.

Clearance of Bush.—The sanitary gang, consisting of six sweepers and one special gang boy, assisted by prison labour when available, kept the township clear of bush.

Sanitary Inspections.—The township was inspected once daily by the Sub-Assistant Surgeon. The Junior Sanitary Inspector carried out regular house-to-house inspections for mosquito and general nuisances.

Weti District.

The Medical Officer performed the duties of Sanitation Officer.

The staff consisted of an Asiatic Sanitary Inspector, one Mosquito Inspector, 18 sweepers, three special gang boys, one overseer, one headman and one donkey boy.

1. Preventive Measures.

(*a*) *Mosquito and Insect-borne Diseases.*

The usual preventive measures, such as oiling of tanks and pits, the clearing and oiling of swamps, the clearing of bush, etc., were taken and have been in force throughout the year. There are four main swamps round the town where Anopheline larvæ can be found almost at any time. These are but poorly drained, and their permanent and proper drainage would go far towards ridding the town of mosquitoes. It is expected that some at least of this work will be carried out next year.

Mosquito nuisances found, numbered 45, for which notices were served. Fifteen cesspools were oiled weekly, as were the four swamps above mentioned. By these measures, together with frequent inspection of premises during the year, the town was kept reasonably free from mosquitoes.

The Anopheline mosquitoes caught in the houses were almost entirely Anopheles costalis, though on two occasions Anopheles maculipalpis was found by the Medical Officer in his own house.

(*b*) *Epidemic Diseases.*

There was very little in the way of epidemic disease in Weti during the year. Vaccinations numbered 1,422.

Eight cases of tuberculosis were diagnosed

(c) *Helminthic Diseases.*

Ankylostomiasis.—During the year 497 cases of this disease were treated as compared with about 400 in 1927. Almost every native is infected, but the number of severe and extreme cases is very evidently on the decrease.

In view of the results of some stool examinations, it is suggested that the anæmias which have hitherto been diagnosed as due to ankylostomiasis, are in reality caused by two separate conditions. Full data and information concerning this point is given later under Scientific, Section IX, page 71.

Bilharziasis.—Infections are much more common than would be supposed, as many urines from patients who showed no signs or symptoms were positive for ova of Schistosomum hæmatobium. A routine examination was made of hospital patients, school children and others who were supposed to be perfectly healthy. The results and deductions are given in Section IX, page 74.

Ascariasis.—The disease is frequently found and occurs more commonly in children than in adults. For incidence in school children see page 30.

2. General Measures of Sanitation.

Sewage Disposal and Drainage.—In the case of European and the better class Asiatic quarters, water-flushed closets draining into cess-pits are in use, while in the older Asiatic quarters the bucket system is still in use, these buckets being emptied frequently and the excreta deposited in the sea.

Public latrines were completed towards the end of year and are now in use so that it is hoped ankylostomiasis and ascariasis will show a decrease.

Refuse Disposal.—During the year 7,324 loads of refuse were removed from the town and incinerated; 18 men were employed on this work.

Water Supply.—For the town this is of very high standard both as regards quality and quantity.

Bush Clearance.—About 40,600 square yards of bush were cleared during the year; ten men were employed on the work.

Sanitary Inspections.—These were made at frequent intervals by the Medical Officer, while the Asiatic Sanitary Inspector exercised constant supervision over the town, assisted by the Mosquito Inspectors and Apprentice Sanitary Inspector.

3. School Hygiene.

The results of the examinations of school children will be found on page 30.

4. Labour Conditions.

As has been mentioned in previous reports, the labour is very largely agricultural, being scattered over the plantations, particularly during the clove-picking season. Of the gangs concerned in road construction, the larger ones have a native dispenser in attendance where one of the permanent dispensaries is not close at hand.

5. Housing and Town Planning.

General supervision is exercised by the Medical Officer and Public Works Officer, who see that the necessary spacing of house and huts is enforced in the township area, and that the requisite window space and ventilation are not wanting.

6. Food in Relation to Health and Disease.

Inspections of the abbatoir and the market with its fly-proof room are undertaken constantly so that everything is kept reasonably free from contamination. At present the milk comes from the country districts in small quantities rendering supervision and inspection difficult.

7. Destruction of Vermin.

During the year 261 rats were caught and destroyed and 122 pariah dogs were poisoned and buried.

A flea index was obtained during the latter seven months of the year; particulars are given in the Scientific Section, page 78.

(B) MEASURES TAKEN TO SPREAD THE KNOWLEDGE OF HYGIENE AND SANITATION.

A considerable advance has been made in methods of spreading the knowledge of hygiene and sanitation by instructing the "Jeanes" teacher of the Education Department in the use of a magic lantern and supplying him with slides to illustrate popular lectures on hook-worm and malaria.

The duties of a "Jeanes" teacher include visits of a few days each to all district schools. During these visits he sets apart two evenings for hygiene lectures, using a magic lantern with a portable screen to illustrate them. These lectures are held in the open and the attendances run into hundreds. It is hoped that the scope of the lectures may be extended when slides illustrating other diseases—leprosy, tuberculosis, and bilharzia, etc.—have been procured.

The Public Health section of the Museum is arranged with a view to exploiting its possibilities as a means of health propaganda. A day-light magic lantern screen has been provided and frequent lantern lectures have been delivered to selected parties of schoolboys, police and others.

On July 31st the Masheha of Zanzibar island were granted an audience by His Highness the Sultan, and advantage was taken of their presence in the town to open the Museum to them after the ceremony. Native demonstrators attended in the Public Health section. Many of the Masheha showed a keen interest in the Public Health exhibits. In the evening a cinema entertainment was given, and among other films "Malaria" and "Unhooking the Hookworm" were shown. Demonstrators, who had previously had the films explained to them in detail, were stationed at intervals in the hall to comment on and explain the films as they were shown. Such an arrangement is not entirely satisfactory and, having tried both the cinema and magic lantern used for propaganda lectures, it is considered that far the best results are obtained by the use of the lantern.

If films depicting only African conditions and with sub-titles in the vernacular were obtainable, they would be of great value, particularly if a lecturer were present to amplify the sub-titles. The expense of such films would, however, be prohibitive, and for use among a district population, to whom both the lantern and cinema are new, it is doubtful whether even the best film well-presented would be of more interest or give an audience any clearer ideas of a subject than lantern slides carefully expounded.

A further method of health propaganda which is being adopted is the provision for the schools and district dispensaries of show cases illustrating the outline of the causes and prevention of malaria, filariasis, hookworm, ascariasis and bilharzia. Each case contains illustrations of the "chains" of infection in malaria and filariasis, the life history of culex and anopheles mosquitoes and a malaria parasite. Actual specimens of adult mosquitoes, ankylostome worms, ascaris worms and Isodora ovoidea—the local mollusc intermediate host of S. hæmatobium—are shown. Explanatory notes are in Kiswahili.

(C) TRAINING OF SANITARY PERSONNEL.

The apprentices receive their practical training from the district inspectors, each inspector is allotted an apprentice who is changed monthly so that they may become familiar with the urban and rural conditions throughout the Protectorate.

Weekly lectures are given by the Sanitation Officer and the Sanitary Superintendent, the syllabus for the lectures being based on "A Treatise on Hygiene and Public Health" by B. N. Ghosh; a copy of this text book has been ordered for each apprentice. Demonstrations on meat inspection are given by the Veterinary Officer at the slaughter-house.

Special coaching and every assistance are given to inspectors to enable them to proceed to Bombay to obtain the certificate of the Royal Sanitary Institute.

(D) RECOMMENDATIONS FOR FUTURE WORK.

Zanzibar Island.

1. *Mosquito and Insect-borne Diseases.*—Further minor anti-malarial works are required in Zanzibar township to prevent the formation of temporary anopheline breeding places during and just after the rains.

Additional anti-malarial work is necessary at Mkokotoni, where there has been a considerable amount of malaria during the year.

2. *Helminthic Diseases.*—*Vide* Economic Biologist's report.

3. *Refuse Disposal.*—The dumping of refuse in the creek and in some of the town disused quarries has been carried out without the creation of nuisance. This method of refuse disposal should be more extensively practised, as it lessens the distances over which refuse has to be hauled and reclaims unsightly tidal areas.

4. *Maternity and Child Welfare.*—Attention is again drawn to the desirability of appointing a Lady Medical Officer to undertake maternity and child welfare work.

5. *Infectious Diseases Hospital.*—The site of the present Infectious Diseases Hospital is very unsatisfactory as, owing to the development of the native township, it is gradually becoming surrounded by dwellings which are situated more closely to the hospital than is consistent with safety from infection to the inhabitants. The removal of the hospital to a more suitable site at Marahubi, as has been advocated for several years, is therefore again recommended.

Pemba Island.

6. *Sanitary Inspector.*—During the coming year it is proposed to post the European Sanitary Inspector to Pemba for some months. This, however, can only be a temporary measure, and an additional appointment to enable a European Sanitary Inspector to be stationed permanently in Pemba is necessary.

7. *Mosquito and Insect-borne Diseases.*—Anti-malarial work and swamp drainage are required in all three stations and will be continued during the coming year.

IV. PORT HEALTH WORK AND ADMINISTRATION.

Port health work was undertaken by a Sanitation Officer throughout the year, pratique being given to vessels between the hours 7 a.m. and 10 p.m.

Immigrants arriving from Bombay are placed under surveillance for a week after arrival and when considered necessary are vaccinated. The baggage of deck passengers from Bombay is claytonised before being passed through the Customs.

The crews and passengers of dhows are required, after pratique has been given, to report at the Health Office for inspection and, if necessary, are vaccinated.

The total number of steamers granted pratique during the year was 592 as compared with 553 in 1927.

The total number of dhows granted pratique was 1,251 as compared with 1,289 in 1927.

During the year five ships in quarantine arrived from Mombasa as follows:—

On January 3rd, an oilship, the S.S. "British Sovereign" arrived without passengers, having landed a case of small-pox at Mombasa. After fumigation the cargo was worked by vaccinated labour and the ship kept in quarantine while in harbour. Officers and crew to the number of 44 were accommodated on Quarantine Island while the ship was being disinfected.

On January 15th, the S.S. "Khandalla" arrived from Bombay, *via* Mombasa, in quarantine for small-pox, and 368 deck passengers were placed under observation on Quarantine Island. The ship was fumigated, and cargo worked by vaccinated labour. Saloon passengers for Zanzibar were placed under surveillance.

On June 2nd, the S.S. "Karagola" arrived from Mombasa in quarantine for small-pox and was subjected to the same measures as the S.S. "Khandalla". Deck passengers to the number of 608 were placed under observation. Two passengers for Dar-es-Salaam, who were suffering from small-pox, were isolated in the Infectious Diseases Hospital.

On June 28th, the S.S. "Mazzini" arrived with one deck and one saloon passenger for Zanzibar, having landed suspected cases of small-pox in Mogadicio and Kismayu. The deck passenger was placed under observation and the ship granted restricted pratique after inspection and disinfection with formalin spray.

On July 4th, the S.S. "Springfontein" arrived from Mombasa, having landed a case of small-pox at Aden on 21st of June. Free pratique was granted after inspection and disinfection.

The following tables show the monthly figures for steamers, dhows and passengers.

Port Sanitation Return, 1928.—Steamers.

Months.	Arrivals.			Ships quarantined.	Ships claytonised.	Passengers landed.	Passengers under surveillance.	Number of persons vaccinated	Persons placed in quarantine.
	British.	Foreign.	Total.						
January ..	29	13	42	2	2	1,643	..	203	412
February ..	34	16	50	..	..	1,944	..	119	..
March ..	35	14	49	..	..	1,206	..	40	..
April ..	29	22	51	..	..	1,383	..	29	..
May ..	32	15	47	..	..	1,474	..	80	..
June ..	39	14	53	2	2	1,773	..	16	608
July ..	32	15	47	1	1	1,141	..	27	..
August ..	35	15	50	..	..	1,316	..	34	..
September ..	32	22	54	..	..	1,434	..	39	..
October ..	33	19	52	..	..	1,110	25	45	..
November ..	38	12	50	..	..	1,318	..	16	..
December ..	29	18	47	..	..	1,662	..	53	..
Total ..	397	195	592	5	5	17,404	25	701	1,020
Total for 1927 ..	343	190	553	..	..	19,954	..	1,376	..

Port Sanitation Return, 1928.—Dhows.

Months.	Arrivals.			Dhows quarantined.	Dhows claytonised.	Passengers under surveillance	Number of persons vaccinated.	Persons placed in quarantine.	Passengers landed.
	British.	Foreign.	Total.						
January ..	86	33	119	..	..	..	333	..	445
February ..	104	68	172	..	..	..	1,307	..	999
March ..	100	76	176	..	..	..	508	..	248
April ..	86	26	112	..	..	..	82	..	235
May ..	71	2	73	..	..	..	32	..	145
June ..	79	3	82	..	..	..	76	..	148
July ..	86	3	89	..	..	..	169	..	143
August ..	81	5	86	..	..	..	191	..	228
September ..	84	3	87	..	..	..	109	..	227
October ..	77	5	82	..	..	..	99	..	240
November ..	80	2	82	..	..	..	115	..	215
December ..	84	7	91	..	..	..	152	..	269
Total ..	1,018	233	1,251	..	..	..	3,173	..	3,542
Total for 1927 ..	1,003	286	1,289	..	..	..	2,644	..	3,967

V. MATERNITY AND CHILD WELFARE.

Beyond rendering all possible assistance to the Zanzibar Maternity Association, the Government medical staff has little time to give to this important branch of public health work.

ZANZIBAR MATERNITY ASSOCIATION.

This is a private Association supported chiefly by subscriptions, donations, and fees from patients who can afford to pay. The Government contributes an annual grant and is represented on the controlling committee. Since its inception in 1918 the history of the Association has been one of continued progress and extended usefulness.

Under Appendix IV, page 108, will be found the annual report of the Association, and the remarks of the Honorary Secretary relating to the excellent work performed by the staff during the past year are endorsed. In this connection the valuable services of Miss Locket, Matron of the Maternity Home, are especially worthy of mention for not only has she personally conducted all the maternity cases admitted to the Home and a large number of cases in private houses, but has also supervised the treatment of the large number of female patients (6,683 new cases, 18,269 repetitions) attending the Mwembeladu Dispensary, and devoted any spare time to ante-natal and child welfare work and the training of pupil midwives.

The importance of the fact that the African native is beginning to appreciate and seek skilled assistance cannot be over estimated, and the most far-reaching results cannot fail to be achieved if the Association receives the support it deserves to enable it to maintain the remarkable progress of the past year.

VI. HOSPITALS AND DISPENSARIES.

(A) OUT-PATIENTS.

The out-patients treated during the year numbered 133,836, making with re-attendances a total attendance of 368,549. These figures show an increase of 26,647 and 54,803 respectively over those for the previous year.

The following table compares the number of new cases treated at each dispensary with those for the previous two years: —

Zanzibar Island.		Cases treated.		
Zanzibar Town.		1926.	1927.	1928.
European	...	418	485	469
Native and Asiatic	...	15,451	17,192	18,717
Prison Infirmary	...	1,155	1,645	940
Police Lines	...	1,925	1,296	2,649
Mwembeladu	...	5,556	9,943	11,883

Zanzibar Island.		Cases treated.		
Northern District.		1926.	1927.	1928.
Mkokotoni	...	2,470	4,268	4,966
Chaani	...	—	—	3,796
Mahonda	...	2,831	3,666	4,263
Mbiji	...	2,912	3,235	3,722
Mangapwani	...	1,498	2,354	6,113
Southern District.				
Chwaka	...	2,395	3,772	2,958
Kizimkazi	...	2,400	2,196	2,909
Uzini	...	49	3,414	3,720
Machui	...	2,219	3,366	2,109
Walezo	...	—	2,280	2,138
Tungu	...	431	2,014	4,308
Bweleo	...	200	1,390	3,219
Mwera	...	2,209	3,641	3,776
Bububu	...	—	2,461	3,727
Selem	...	3,734	3,611	5,683
Pemba Island.				
Weti District.				
Weti	...	4,153	4,257	4,650
Matangatwani	...	1,567	3,015	2,658
Tumbe	...	816	1,071	838
Mzambaraoni	...	604	1,915	1,763
Chake Chake District.				
Chake Chake	...	8,675	8,052	11,072
Tundaua	...	1,008	1,834	1,651
Ole	...	242	1,632	1,503
Stambuli	...	1,695	1,510	2,085
Mkoani District.				
Mkoani	...	5,589	4,862	5,700
Kengeja	...	2,000	3,394	3,871
Jambangome	...	1,492	1,940	2,330
Fufuni	...	891	1,478	1,239
Road Construction Camps	...	—	—	2,411
		76,585	107,189	133,836

Reference to the prevailing diseases treated has already been made under Section II, Public Health.

District Dispensary Service.

The undiminished popularity of the district dispensaries as a whole is evidenced by the continued increase in attendances shown in the table on the previous page, and most valuable work has been done during the year. Much more, however, could be done if an adequate staff were available.

The Medical Officer who visits and supervises all details connected with the dispensaries in Zanzibar island not only trains the dispensers and superintends the dispensing and despatch of drugs and other supplies for all dispensaries in both islands, but also has under his charge the prison, police lines and lunatic asylum.

In Pemba the position is in some respects even less satisfactory. There are only two Medical Officers in the island, each of whom has charge of a hospital with a large amount of operative work. In addition to their hospital duties, the leper settlement and all sanitation work come under their control, and they have thus little time to devote to the district dispensaries.

Should one of the Medical Officers in either island be unable to perform his duties from any cause, there is no one to replace him, with the inevitable but none the less disappointing result that some of the dispensers prove failures solely through lack of supervision, leading to loss of confidence in dispensary treatment among the natives, necessitating the training of replacements and causing general departmental disorganization.

The potentialities of the district dispensary service cannot be over-estimated, and with the support it deserves could be put on a satisfactory basis and most remarkable results achieved. The denser population of this Protectorate as compared with that of the mainland territories enhances the value of the service out of all proportion.

The provision of one more Medical Officer for each island and two or three additional dispensaries would enable satisfactory supervision to be exercised and medical aid to be brought within reach of the whole population; the dispensers could be more thoroughly trained and the whole Protectorate mapped out into areas, for each of which a dispenser would be responsible for propaganda and all matters connected with public health; the home treatment so long urgently required for patients unable to be admitted to hospital could be provided to some extent, especially in the townships, and the overworked medical staff would obtain some respite.

In Zanzibar Island, Dr. Gopsill was in charge of the dispensary service from January 1st to May 7th, and Dr. Watkins-Pitchford from June 21st until the end of the year. From May 7th to June 21st no Medical Officer was available. In Pemba, Dr. Pitchford, as Medical Officer, Weti, was in charge of the Weti District Dispensaries from January 1st to June 21st, and Dr. McCarthy from June 22nd to the end of the year. Dr. Austin, as Medical Officer, Chake Chake, was for the whole year in charge of the dispensaries in the Chake Chake and Mkoani Districts. That so much valuable work has been accomplished under difficult conditions speaks most highly for the services rendered by these officers assisted by Dispensers Livingstone and Bunsef. The Service sustained a great loss by the death of the latter in September.

Only one new dispensary was established during the year. This was opened in the month of February at Chaani in the northern district of Zanzibar island. For the time being part of the district court-house is utilized, but it is hoped to provide more suitable accommodation during the coming year. In both islands, 24 district dispensaries in all were in existence at the end of the year. Two native dispensers were stationed for the greater part of the year at

road construction camps, and favourable reports were received of their work. Simple drugs and dressings were also supplied to various departments for emergencies, minor ailments and injuries occurring among employees, and to a teacher for pupils of a district school out of easy reach of a dispensary. In this manner a considerable number of cases not included in the returns were treated in addition to the pupils (1,991 new cases 8,690 attendances) attending the Zanzibar school clinic.

(B) IN-PATIENTS.

The following table shows the number of patients treated and deaths occurring in each Government Hospital during the past and previous two years:—

	1926.		1927.		1928.	
ZANZIBAR ISLAND.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Zanzibar Town.						
European ...	76	—	59	2	45	1
Native and Asiatic ...	1,305	112	1,193	90	1,288	99
Prison Infirmary ...	356	12	255	8	141	3
Police Lines ...	193	—	259	5	151	3
Infectious Diseases ...	68	15	63	19	16	—
Northern District.						
Mkokotoni ...	90	—	70	1	198	—
Southern District.						
Walezo Poor House ...	—	—	395	90	407	122
Selem ...	46	1	86	—	70	1
PEMBA ISLAND.						
Weti District.						
Weti ...	467	16	508	29	499	12
Chake Chake District.						
Chake Chake ...	496	27	512	42	603	25
Mkoani District.						
Mkoani ...	127	4	158	5	141	5
	3,224	187	3,558	291	3,559	271
Cases remaining from previous year ...	194	—	216	—	226	—
Total number of cases treated, and deaths ...	3,418	187	3,774	291	3,785	271

The more important causes of admission and death during the year were as follows:—

	Cases.	Deaths.		Cases.	Deaths.
Paratyphoid B.	6	3	Pneumonia	63	16
Malaria	292	1	Duodenal Ulcer	3	2
Blackwater fever	10	3	Ankylostomiasis	250	23
Small-pox	2	—	Appendicitis	6	1
Dysentery	84	4	Hernia	142	5
Tetanus	3	3	Nephritis	13	6
Tuberculosis	99	39	Hydrocele	203	4
Cancer	15	4	Elephantiasis	35	2
Apoplexy	5	4	Fractures	45	5
Paralysis	8	5	Other Injuries	384	8
Heart Disease	17	10	Senile and General Debility	159	77
Broncho-Pneumonia	10	3			

The advantages of hospital treatment are fully appreciated by a not inconsiderable proportion of the native population. In Pemba, the present accommodation is altogether inadequate to meet the demands, and in Zanzibar there is usually a waiting list of sufficient length to keep all beds occupied for several months in advance. The provision of additional accommodation for both Africans and Asiatics and an adequate staff is becoming yearly a matter of greater urgency.

1. Zanzibar European, Asiatic and Native Hospitals.

Dr. Young continued to act as Resident Surgical Officer until April, when he was relieved by Dr. Vassallo, who remained in charge until the end of the year. Dr. McCarthy acted as Assistant Medical Officer until June, and Dr. Jermy from June until the end of the year.

In addition to the Resident Surgical Officer and Assistant, the medical staff consisted of a Matron, three Nursing Sisters, a Sub-Assistant Surgeon and two Dispensers.

The following short summary gives some small indication of the work performed by this staff: —

Out-patients, new cases	...	19,186
Out-patients, re attendances	...	39,110
In-patients	...	1,333
Maternity cases	...	30
Ante-natal visits	...	162
Operations, major	...	576
Operations, minor	...	960
Injections	...	3,017
Medical boards	...	45
Medical examinations	...	257
X ray screenings	...	211
X ray photographs	...	64
Post-mortem examinations	...	21
Visits to patients	...	2,000

Among the 576 major operations performed were the following: —

Hydrocele	87	Amputations	14
Laparatomy	11	Ovarian Cyst	3
Hernia, radical cure	100	Hydatid Cyst	1
Hernia, strangulated	6	Fibroids (Uterine)	3
Filarial Scrotum	28	Colostomy	2
Enucleation Eye	2	Gastro-Jejunostomy	4
Appendicitis	5	Thyroidectomy	2
Mastoid	8	Cæsarean Section	1
Cataract	3	Carcinoma Breast	1

The deaths following operation numbered 27.

(*a*) *European Hospital.*

Of the 45 cases admitted during the year, 11 were officials and 34 non-officials. One death from endocarditis occurred among the latter. Other important causes of admission were: —

Paratyphoid B	1	Appendicitis	2
Malaria	8	Hydrocele	1
Blackwater Fever	1	Carbuncle	1
Dysentery	1	Ptomaine Poisoning	1
Mastoiditis	1	Fracture	2
Pericarditis	1		

The daily average in hospital during the year was 1.70 as compared with 1.10 in 1927 and 2.02 in 1926.

(*b*) *Asiatic and Native Hospital.*

Of the 1,288 patients admitted during the year, 306 were Asiatics (127 Arabs) and 982 Africans. Twenty-three of the 99 deaths occurred among the former and 76 among the latter.

The more important causes of admission and death were as follows: —

	Cases.	Deaths.		Cases.	Deaths.
Paratyphoid B	2	1	Duodenal Ulcer	3	1
Malaria	105	1	Ankylostomiasis	55	10
Blackwater Fever	4	2	Appendicitis	3	1
Dysentery	26	3	Hernia	106	4
Tetanus	3	3	Nephritis	5	—
Tuberculosis	28	9	Hydrocele	100	3
Filariasis	18	—	Uterine Fibroid	11	—
Cancer	11	2	Normal Labour	20	—
Diabetes	2	1	Ectopic Gestation	1	—
Meningitis	3	—	Puerperal Eclampsia	2	—
Myelitis	3	—	Elephantiasis	17	1
Apoplexy	3	3	Osteitis	2	1
Mastoiditis	4	—	Burns	10	3
Heart Disease	10	3	Fracture	23	4
Broncho-Pneumonia	5	1	Other Injuries	129	4
Pneumonia	35	12			

The daily average in hospital during the year was 67.16 as compared with 51.58 in 1927 and 54.21 in 1926.

2. Mkokotoni Hospital.

The medical staff consisted of a resident Sub-Assistant Surgeon and a visiting Medical Officer.

Summary of the work done: —

Out-patients (new cases)	...	4,964
Out-patients (re-attendances)	...	5,854
In-patients	...	198
Minor operations	...	213
Injections	...	2,178
Vaccinations	...	98

The daily average in hospital during the year was 4.2 as compared with 2.8 in the previous year.

Hospital accommodation for female patients is required.

3. Chake Chake and Mkoani Hospitals.

Dr. Austin was in charge of these hospitals throughout the year, assisted by a Nursing Sister, two Sub-Assistant Surgeons and a Dispenser. Dr. Austin had also under his control six district dispensaries, the road construction camps and all the sanitation duties connected with Chake Chake and Mkoani townships and districts.

The following is a short summary of the work performed in connection with the hospitals and dispensaries:—

Out-patients (new cases)	Chake Chake	... 11,072
,, ,,	Mkoani	... 5,700
,, ,,	Districts	... 15,090
Re-attendances		... 49,672
In-patients, Chake Chake		... 603
In-patients, Mkoani		... 141
Operations (major) Chake Chake		... 196
Operations (minor) Chake Chake		... 526
Operations (minor) Mkoani		... 179
Injections		... 2,501
Laboratory examinations		... 1,350
Vaccinations		... 3,182

The daily average in Chake Chake hospital was 22.35 as compared with 23.71 in 1927 and 21.17 in 1926, the more important causes of admission and death during the past year being as follows:—

	Cases.	Deaths.		Cases.	Deaths.
Malaria	54	—	Ankylostomiasis	52	5
Blackwater Fever	4	—	Hernia	14	—
Dysentery	10	1	Peritonitis	1	1
Tuberculosis	8	2	Nephritis	3	2
Filariasis	21	—	Schistosomiasis	14	—
Cancer	1	—	Hydrocele	44	—
Apoplexy	1	1	Elephantiasis	5	—
Myocarditis	2	2	Arthritis	4	1
Pneumonia	9	2	Fracture	9	—

Among the major operations performed were hernia 13 (strangulated 4), hydrocele, radical cure, 44; amputations 6; laparotomy 1; sarcoma 1; arthrotomy 2; suprapubic cystostomy 3; non-malignant tumours 6; cysts 6; tenoplasty 1; hæmorrhoids 3.

The more important causes of admission to Mkoani hospital were as follows:—

	Cases.	Deaths.		Cases.	Deaths.
Malaria	5	—	Ankylostomiasis	23	1
Dysentery	1	—	Hernia	3	—
Tuberculosis	2	1	Nephritis	1	—
Filariasis	2	—	Cellulitis	3	1
Asthma	1	1	Fracture	2	—
Pneumonia	4	1			

Three European and 18 non-European officials were admitted to Chake Chake and one non-European official to Mkoani hospital. One death of a European official occurred at Chake Chake.

4. Weti Hospital.

Dr. Pitchford continued in charge of this hospital until June 20th, when he was relieved by Dr. McCarthy, who remained in charge until the end of the year. In addition to the Medical Officer, the medical staff consisted of a Nursing Sister for eleven months, a Sub-Assistant Surgeon for nine months and a Dispenser for three months.

The Medical Officer had also under his control the leper settlement, three district dispensaries and all the sanitation duties connected with Weti township and district. The following is a short summary of work performed in connection with the hospital and dispensaries:—

Out-patients (new cases) Weti	... 4,650
,, ,, District	... 5,256
,, (re-attendances)	... 20,707
In-patients	... 499
Operations (major)	... 165
Operations (minor)	... 275
Injections	... 633
Laboratory examinations	... 1,094
Vaccinations	... 1,422

The more important causes of admission to hospital and death were:—

	Cases.	Deaths.		Cases.	Deaths.
Malaria	34	—	Broncho-Pneumonia	2	2
Blackwater Fever	1	—	Pneumonia	6	—
Dysentery	5	—	Ankylostomiasis	33	—
Tuberculosis	8	2	Hernia	13	—
Beri Beri	4	—	Hydrocele	50	1
Cataract	9	—	Orchitis	10	—
Pericarditis	1	1	Elephantiasis	5	1

Among the major operations performed were cataract 3; elephantiasis 1; hernia 11 (one strangulated); hydrocele, radical cure, 33; amputations 3; tumours 4; hæmorrhoids 6; fractures 2, varicocele 1.

The daily average in hospital was 16.73 as compared with 10.7 in 1927 and 13.10 in 1926.

One European and eight non-European officials were admitted to hospital. No death occurred among these.

(C) OPERATIONS.

The following is an analysis of the more important operations performed at all hospitals in the Zanzibar Protectorate during 1928:—

1. *Bones—Operations on—*	
Trephining	1
Osteomyelitis	15
Amputations	17
2. *Abdominal Operations—*	
Penetrating wound	6
Appendix	4
Appendix with peritonitis	1
Peritonitis	2
Gastro-jejunostomy	4
Perforated duodenal ulcer	2
Carcinoma of liver	3
Intestinal adhesions	1
Colostomy	1
Extraperitoneal abscess	1
3. *Gynæcological Operations—*	
Curettage	7
Ovarian cystectomy	3
Imperforate hymen	1
Cæsarean section	1
Salpingectomy	2
Hysterectomy	3
Vesico-vaginal fistula	1
Repair of perineum	1
Excision of bartholin gland	1

4. *Genito-Urinary Operations—*	
Hydrocele	172
Hæmotocele	3
Orchidectomy	39
Urethrotomy	6
Varicocele	5
Filarial scrotum	31
Urethral fistulæ	9
Funiculitis	1
Cystoscopy	4
Suprapublic cystotomy	3
5. *Herniotomy—*	
Inguinal	120
Femoral	1
Strangulated	12
6. *Adenectomies—*	
Cervical	2
Inguinal and Femoral	25
Submaxillary	2
7. *Rectal—*	
Sigmoidoscopy	2
Fistula-in-ano	2
Imperforate anus	2
Hæmorrhoids	27
Ischio-rectal abscess	1
8. *Ear, Nose and Throat—*	
Mastoid	8
Tonsillectomy	20
9. *Eye—*	
Cataract	6
Enucleation of eye	2
Reduction of dislocated eye-ball	1
10. *Joints—*	
Dislocation	3
Compound dislocation	2
Bursitis	9
Arthrotomy	2
11. *Muscles and Tendons—*	
Suturing of tendons	26
Ganglion	3
Tenoplasty	1
12. *Tumours and Cysts—*	
Lipoma	6
Fibroma	10
Carcinoma (breast)	1
Sarcoma	1
Simple Cyst	11
Hydatid Cyst	1
13. *Removal of Foreign Bodies—*	
Under X ray	5
14. *Miscellaneous Operations—*	
Cellulitis	66
Exploration of ulnar nerve	2
Thoracotomy	1
Thyroidectomy	2
15. *Plastic Operations—*	
Plastic (unclassified)	1
Hare lip	1
Skin Graft	2

(D) MEDICAL BOARDS AND EXAMINATIONS.

Of 45 Medical Boards held during the year, one was on a European official, 12 on non-European officials and 32 on Government employees ranking below the 4th Grade. Of 274 Medical Examinations, 114 were of candidates for Government employment, 134 of European and non-European officials prior to proceeding on leave and 26 special examinations for various purposes.

(E) X RAY EXAMINATIONS.

During the year 211 examinations were made and 64 photographs taken. The obsolete apparatus installed thirteen years ago completely broke down in November. Throughout the year it had been giving constant trouble, but, thanks to the assistance always readily given by the Director of Electricity and his staff, much valuable work was done before the final break-down occurred. Arrangements have been made for the early installation of an up-to-date apparatus.

(F) DENTAL SERVICE.

The arrangement with the Tanganyika Territory Government was continued, and the Dental Surgeon, Captain A. S. Newton, paid one

visit of 54 days to the Protectorate during the year. The following work was done for European officials and their families:—

Attendances	211
Fillings	63
Extractions	75
Pulp Treatment	14
Scalings	31

In addition, many non-European officials, school children and natives generally, received treatment, and dènture and denture repair work was undertaken as far as time permitted.

(G) GULIONI INFECTIOUS DISEASES HOSPITAL.

Returns for the Year 1928.

	Remaining from 1927.	Admitted during 1928.	Total.	Died.	Discharged.	Remaining end of 1928.	
Cases:							
Small-pox	...	*2	2	...	2	...	*Ex. S. S. Karagola.
Measles	...	4	4	...	4	...	
Chicken-pox	...	7	7	...	6	1	
Leprosy	...	3	3	...	*1	2	*Transferred to Funzi Leper Settlement.
Total	...	16	16	...	13	3	
Contacts:							
Small-pox	...	9	9	...	9	...	
Measles	...	3	3	...	3	...	
Total	...	12	12	...	12	...	
Grand Total	...	28	28	...	25	3	

(H) BUILDINGS.

Statement of work carried out during 1928:—

		Rs.	Cts.
Native Hospital (additions and repairs)		9,786	67
European Hospital	(repairs)	333	71
Police Lines Hospital	,,	164	44
Mwembeladu Dispensary	,,	14	09
Bu-bu-bu Dispensary	,,	20	00
Mahonda Dispensary	,,	253	83
Chwaka Dispensary	,,	168	09
Central Dispensary	,,	145	56
School Clinic	,,	70	53
Office	,,	85	27

VII. PRISONS AND ASYLUMS.

(A) PRISONS.

At the beginning of the year there were 207 prisoners in the Protectorate prisons. During the year, 1,779 were admitted, 1,786 were discharged and three died, leaving 199 in prison at the end of year. The daily average number in prison was 210.73.

The total number of cases of illness treated was 1,923, and of these 232 were admitted to hospital. Of the three deaths, all of which occurred in the Central Prison, Zanzibar, one was due to hemiplegia, one to mesenteric thrombosis and one to paratyphoid B. During the year, three prisoners were released on medical grounds, the illnesses being pulmonary tuberculosis, ankylostomiasis and leprosy.

In the previous year ten deaths occurred and two were released on medical grounds.

1. Central Prison, Zanzibar.

At the beginning of the year there were 149 prisoners in this prison. During the year 759 were admitted and 765 discharged, the daily average number being 135.13. Three deaths occurred, and of those discharged three were released on medical grounds as recorded above. The total number of cases of illness treated was 940 with 4,805 re-attendances, the daily average under treatment being 15.73. Admissions to hospital numbered 162, the daily average in hospital being 5.47.

The above figures show a great improvement in the health of the prisoners as compared with the previous year, when the average number of prisoners was 152.9, with eight deaths, two discharged on medical grounds, 1,226 cases treated and 255 admissions to hospital.

2. District Prisons.

No deaths occurred during the year in the district prisons, and no prisoners were released on medical grounds.

At Mkokotoni, the daily average number of prisoners was 12.26 and 385 cases of illness were treated with 14 admissions to hospital; at Weti, the daily average was 25.92 with 213 cases treated and 13 admissions to hospital; at Chake Chake, the daily average was 29.93 with 330 cases treated and 36 admissions to hospital, and at Mkoani, the daily average 7.49 with 55 cases treated and 7 admissions to hospital.

At Mkoani a new prison with improved sanitary accommodation is in course of erection.

(B) LUNATIC ASYLUM.

	Males.	Females.	Total.
Patients remaining 31st December, 1927 ...	11	7	18
Patients admitted ...	6	3	9
Patients discharged cured ...	3	—	3
Patients discharged to care of relations ...	1	—	1
Patients died ...	3	—	3
Patients remaining 31st December, 1928 ...	10	10	20

The following returns are supplied with regard to the variety of mental alienation:—

	Remaining from 1927.	Admitted.	Discharged.	Died.	Remaining end of 1928.
Melancholia	6	3	2	1	6
Mania	5	2	—	—	7
General Paralysis	1	1	—	1	1
Epileptic	—	2	—	—	2
Senile	6	1	2	1	4
Total	18	9	4	3	20

The cases of illness, other than mental, treated numbered 103, and of these seven were admitted to hospital.

Of the three deaths one was due to general paralysis, one to cerebral syphilis and one to ankylostomiasis.

Only two of the inmates remaining in the Asylum at the end of year showed any signs of mental improvement.

The urgent need for the provision of a mental hospital, in which the earlier and more curable forms of mental alienation can be treated and properly cared for, has been drawn attention to in the medical reports for many years.

(C) POOR ASYLUM.

The Poor Asylum, situated at Walezo, about four miles from Zanzibar Town, is under the care of two sisters of the Roman Catholic Mission, and is visited weekly or more frequently as required by a Medical Officer and Sub-Assistant Surgeon. A large number of destitute and incurable cases are treated, nursed and generally cared for by the sisters with great skill and sympathy. A considerable number of natives living in the immediate neighbourhood also seek treatment as out-patients for various ailments, and many of the more serious cases among these are admitted to hospital when accommodation is available. Much useful and beneficial work is therefore being done, and it is hoped during the coming year to extend this by putting aside a ward for tuberculosis patients, thus relieving the general hospitals of cases which often for long periods occupy beds urgently required for more acute conditions.

The following is the return of in-patients for the year:—

	Males.	Females.	Total.
Patients remaining on 31st December, 1927 ...	71	36	107
Patients admitted during 1928 ...	315	91	406
Patients died during 1928 ...	86	36	122
Patients discharged during 1928 ...	231	44	275
Patients remaining at the end of 1928 ...	69	47	116

The principal causes of death were senile debility 68, tuberculosis 24, paralysis 7, ankylostomiasis 5, nephritis 4, heart disease 3.

The number of out-patients treated was 2,138 with 5,568 re-attendances, the more common conditions being malaria 297, yaws 119, tuberculosis 51, venereal disease 151, chronic rheumatism 55, respiratory diseases (pneumonia 8) 127, digestive diseases (ankylostomiasis 488) 705, skin and cellular tissue diseases 285.

(D) LEPER SETTLEMENT.

See Appendix II (page 105).

VIII. METEOROLOGY.

A brief summary of the meteorological returns available is contained in Table IV, page 94. From this it will be seen that in Zanzibar township the total rainfall for the year (59.19 inches) is slightly below, but the number of rainy days (117) considerably above the average. At Banani, in Pemba island, both the total rainfall (84.18 inches) and the number of rainy days (172) were considerably above the average. The absolute maximum temperatures were recorded as 91.8° on the 18th of February in Zanzibar and 92° on six days in February, March and April in Pemba. The absolute minimum was recorded as 69.8° on the 23rd of August in Zanzibar and 71° on the 2nd and 5th of August in Pemba. In Zanzibar the greatest rainfall occurred in April (10.04 inches) and November (18.95 inches); in Pemba, in April (20.96 inches), May (25.33 inches) and November (11.91 inches). The mean relative humidity for the year in Zanzibar Town was 74 per cent, the highest monthly mean being 79 per cent for April.

J. A. TAYLOR,

Director of Medical and Sanitary Services.

IX. SCIENTIFIC.

(A) ANNUAL REPORT OF THE BIOLOGICAL DIVISION FOR 1928.

Staff.

Comprises the Economic Biologist and three Native Attendants.

Ankylostomiasis.

Investigations were continued from the previous year and this report should be read in conjunction with that for 1927 and considered as an amplification.

The following graphs show the results of quantitative examinations of various groups of natives, and the tabulated results give the number of ova per gramme.

Graph No. 6.—A group of 50 male natives from Mangapwani. Mangapwani is situated in the north-west of the island. The climate is wet and the country surrounding the village is bushed, with deep shade. Most of the inhabitants are agriculturists. Evidence of soil pollution was found at many spots, generally in small shady copses.

The average number of ova per gramme was 4,064.

Graph No. 7.—Represents a group of 50 male natives from Kombeni. Kombeni is eight miles south of the town. The climate is dry, soil light with outcropping coral-rag. Evidence of soil pollution was found at a few spots, but the appearance of the stools showed much desiccation. Undoubtedly, soil and climatic conditions are not suitable for Ankylostome larvæ.

The average number of ova per gramme was 1,936.

Graph No. 8.—A group of 50 natives from Chaani. A large, straggling village in the north of the island. Rainfall heavy. Soil a red loam, in places outcrops of clay. Dense vegetation. The district is well watered, rivers and many large swamps are to be found. Under such conditions one would expect to find a severe hookworm incidence.

The average number of ova per gramme was 6,628.

Graph No. 9.—Thirty-three natives from Tunguu. The villagers of this scattered district were not very willing to submit samples for examination. The area investigated is heavily cultivated in parts; clove trees predominate. The local dispenser reported that many patients present themselves for hookworm treatment. As will be seen from the graph the average ova per gramme is high.

The average number of ova per gramme was 4,136.

Graph No. 10.—One hundred natives from Chwaka, a small village on the east coast. The majority of the inhabitants are fishermen and stock owners. Very little cultivation is undertaken. At certain seasons of the year millet and other cereals are planted. The village is of interest in that it is the only place in the island where the inhabitants make use of a communal defæcating ground. Near the village, and close to the sea, there is an extensive area covered

with low bush and fairly shady. Evidence of gross pollution is seen on all sides. The soil is light sand covered with short grass. Samples revealed numbers of sheathed larvæ. The rainfall is low, and during the dry season, in spite of the amount of soil pollution, conditions are unsuitable for the development of larvæ.

The average number of ova per gramme was 2,448.

Graph No. 11.—Fifty males from the Poor House at Walezo. Many types of mainland natives are included. Very few were from the Protectorate. The sisters in charge had noticed many suffering from hookworm. As was to be expected, the rate was high.

The average number of ova per gramme was 7,122.

Graph No. 12.—A series of sergeants and corporals from the Police Lines at Ziwani. They were selected by the Officer-in-Charge as the best men in the lines, both physically and mentally. Considering that the men are housed under ideal conditions and are well fed, the hookworm rate is higher than expected.

The average number of ova per gramme was 1,911.

Graph No. 13.—One hundred boys from the Government Town School. The boys varied in age from 6 to 15 years. Most of them live in the African quarter; many of them have cesspits in their houses. None of them complained of indisposition.

The average number of ova per gramme was 2,847.

Graph No. 14.—Sixty-three boys from Mwera School. Average age 8 to 15 years. The climate and local conditions of Mwera are ideal for the development of larvæ. Most of the boys admitted to defæcating in the open.

The average number of ova per gramme was 9,261.

Graph No. 15.—Seventy-six boys from Mangapwani School. Average age 8 to 12 years. The village is better sanitated than most; many houses have deep cesspits.

The average number of ova per gramme was 2,490.

Graph No. 16.—Seventy-six boys from Ndijani School. Average age 8 to 15 years. Ndijani is situated in the centre of the island. The climate is dry; earth a light red loam with patches of outcropping coral-rock. No swamps or streams in the vicinity.

The average number of ova per gramme was 3,572.

Graph No. 17.—Fifty-nine boys from the Industrial School, Zanzibar Town. A mixed group, comprising many youths from the mainland. The majority live in the African quarter, and their houses are provided with deep cesspits.

The average number of ova per gramme was 4,001.

Graph No. 18.—Twenty-seven cases sent from the Central Hospital. All of them were diagnosed as hookworm, showing typical clinical symptoms. All except three showed over 10,000 ova per gramme.

The average number of ova per gramme was 27,818.

GRAPH No. 1.

Graph No.	Locality, Occupation, Date Examined.	No. Examined	No. Positive	No. Negative	E. P. G. 1-1000	E. P. G. 1000-2000	E. P. G. 2000-3000	E. P. G. 3000-4000	E. P. G. 4000-5000	E. P. G. 5000-6000	E. P. G. 6000 7000	E. P. G. 7000-8000	E. P. G. 8000-9000	E. P. G. 9000-10000	Over 10000	Average number of eggs per gramme for the group.
6	Managapwani Agriculturists 14-2-28 to 29-3-28	50	49	1	3	7	12	10	8	2	2	0	0	1	4	4064
7	Kombeni Agriculturists Fishermen 26-4-28 to 17-5-28	50	48	2	18	23	5	1	0	1	0	0	0	0	0	1936
8	Chaani Agriculturists 21-5-28 to 18-6-28	50	50	0	6	3	8	15	3	0	3	4	2	0	6	6628
9	Tunguu Agriculturists 26-6-28 to 2-7-28	33	33	0	3	2	7	8	3	1	3	1	1	0	4	4136.36
10	Chwaka Fishermen Stock owners 20-8-28 to 31-8-28	100	94	6	28	21	14	14	4	4	5	1	2	0	1	2448
11	Poor House Paupers 6-9-28 to 29-9-28	50	49	1	10	4	5	10	0	6	3	0	1	0	10	7122

GRAPH NO. 1.—(*Continued.*)

Graph No.	Locality, Occupation, Date Examined.	No. Examined	No. Positive	No. Negative	E. P. G. 1-1000	E. P. G. 1000 2000	E. P. G. 2000-3000	E. P. G. 3000-4000	E. P. G. 4000 5000	E. P. G. 5000-6000	E. P. G. 6000-7000	E. P. G. 7000-8000	E. P. G. 8000-9000	E. P. G. 9000-10000	Over 10000	Average number of eggs per gramme for the group.
12	Ziwani Lines Askaris 23-7-28 to 9-10-28	53	51	2	22	6	7	3	4	2	4	0	0	0	3	1911
13	Central School (Zanzibar) School Boys 6 6-28 to 6-8-28	100	99	1	37	21	10	12	5	2	2	2	1	2	5	2847
14	Mwera School Boys 3-9-28 to 15-9-28	63	62	1	7	5	4	11	3	0	4	0	0	1	27	9261
15	Mangapwani School Boys 21-9-28 to 28-9-28	76	73	3	38	11	5	6	1	2	4	1	1	1	3	2490
16	Ndijani School Boys 2-10-28 to 5-10 28	76	75	1	11	21	10	10	4	3	7	4	1	0	3	3572
17	Industrial School School Boys 15-11-28 to 30-12-28	59	55	4	12	9	12	5	3	1	3	0	1	2	7	4001.69

GRAPH No. 18.

Hospital Cases No.	E.P.G.	Hospital Cases No.	E.P.G.
1	5,400	15	10,800
2	36,600	16	11,700
3	30,900	17	9,600
4	34,200	18	25,500
5	34,200	19	27,600
6	24,200	20	113,400
7	34,200	21	51,000
8	11,100	22	35,400
9	12,900	23	32,700
10	8,400	24	21,300
11	14,400	25	19,200
12	12,900	26	12,900
13	33,600	27	46,800
14	40,200		

Average number of eggs per gramme for the group = 27,818.

The 17 graphs show an average of 3,377 ova per gramme. This is a fair index of the quantitative infection for the island. The material selected was chosen from various districts in the Protectorate, showing different topographical and meteorological conditions. Males, females and children were investigated. It clearly shows that heavy infections occur in the north and central parts of the island. The south, with its dry climate, is lightly infected.

Human Experiments.—Two native volunteers offered themselves for experiment. The following tests were carried out:—

Experiment No. 1.—A native, who had been examined daily for four months, no ova were found in his fæces. Larvæ isolated with the Baermann apparatus from soil obtained from Chwaka. The resulting culture showed numbers of sheathed larvæ. These were strewn on sterile soil and bandaged on the arm of the volunteer and left in position for half an hour, the patient complained of intense itching. For several days afterwards the patient's arm was swollen with formation of blebs. After one month, ova of Ankylostome were found in his fæces. This experiment was undertaken to prove that the sheathed larvæ found in soil samples were the progeny of human hookworms.

Experiment No. 2.—A native who was known to have a heavy infection of Ankylostomes was used. His fæces were collected and placed on an open sea beach, fully exposed to the sun, but not reached by high water. The site selected showed no evidence of contamination; it was fenced and protected by wire. After six days soil was collected from beneath the fæces and passed through the Baermann apparatus, the result was a rich culture of sheathed larvæ. A second volunteer offered himself. The same procedure was followed as in the first experiment. The larvæ were spread on sterile soil and bandaged on the patient's arm for half an hour. The result was intense irritation with a severe urticarial rash. This volunteer showed numerous ova after one month. The native used had shown no ova in his fæces for many months previous to the experiment. This last

experiment was undertaken to prove that under given conditions sea beaches can be infective for short periods.

Soil Pollution: The Ripe or Encysted Larvæ of Human Ankylostomes.—Soil was tested from various districts as to its suitability as a medium for Ankylostome larvæ.

The soils of the Protectorate are made up of sea sands, light sand mixed with humus, red loam, black clay, etc. Samples of all these earths were taken and sterilized. After sterilisation a rich culture of Ankylostome ova was spread on the surface. The cultures were watered daily and kept in the shade. After six days the soil was passed through the Baermann apparatus. In every case rich cultures of Ankylostome larvæ were obtained. This shows that most of the soils in the Protectorate are in themselves suitable for the development of larvæ, provided that shade and moisture conditions are favourable.

Soil from Chaani.—One of the villages showing the highest rate of Ankylostome infection was studied. Many spots around the village were found showing evidence of gross pollution. The soil was a heavy black loam. All samples taken revealed sheathed larvæ in countless numbers.

Ascariasis.

As mentioned in the report of 1927, this parasite is common in man.

Of 1,088 stools examined, 308 were positive or 27.3 per cent.

In some districts the incidence is as high as 90 per cent. Such heavy infections are generally found in the dry districts of the south, where water is obtained from deep wells.

Considering that these wells are open and unprotected, and that the climate is dry and windy, it is probable that the wells are infected with Ascarid ova.

Fæces of the red bush-pig have been examined, and in every instance ova of a species of Ascaris were found. This may also account for some of the heavy infections in the south of the island.

Bilharziasis.

One hundred and forty-four school children were examined during the year. Of these, 60 proved positive or 41.7 per cent.

Total number of children examined in 1927 and 1928 was 411. Of these 87 showed ova or 21.1 per cent.

During 1928 children were examined from the following villages:—

Chaani and Kinyasini.

Number examined	50
Number positive	42 = 84%

The average age of the children was about eight years. All of them admitted to bathing in various swamps in the district. Numbers of Isodora ovoidea were found at sites where the children said they bathed. The villages of Chaani and Kinyasini are of some interest as the inhabitants are parasitised heavily.

The following graph shows the extent of the various infections:—

Ankylostomiasis.	Incidence 100%.	Average ova per gramme = 6,628
Ascariasis.	42%.	
Bilharziasis.	84%.	
Malaria.	82%.	Gametes 10%.
Filariasis. Mf. bancrofti.	30%.	

Cheju and Jendele.

Number examined	24.
Number positive	2 = 8.2%

Both these districts are situated in dry areas; there are no permanent swamps or rivers. At Cheju, swamps form during the rains.

Kombeni.

Number examined	50.
Number positive	3 = 6%.

A district in the south of the island. No swamps or rivers. In all probability infection was obtained while visiting other areas.

Muyuni.

Number examined	49.
Number positive	6 = 12.2%.

A large, straggling village in the south of the island. There is one large swamp, where the villagers bathe and wash their clothes. At the time the examination was undertaken, large numbers of Isodora ovoidea were found.

A number of urines clinically suspected of Bilharziasis were sent in from various hospitals, dispensaries, institutions, etc.

Total number examined	144.
Total number showing cercariæ	9 = 1.9%

The majority of the patients were adult males, and represented all types of natives, both from Zanzibar and the mainland.

The Intermediate Host of Schistosomum Hæmatobium.—Dissections were made throughout the year of Isodora ovoidea.

Total number dissected	465.
Total number showing cercariæ	9 = 1.9%.

The nine snails showing infection came from various parts of the Protectorate. The cercariæ were morphologically identical with those of Schistosomum hæmatobium.

Repeated attempts were made to infect Isodora ovoidea with urine rich in ova of S. hæmatobium; all proved failures under varying conditions, both in the laboratory and in the field. I surmise that this was due to a hyper-infection with miracidia, as the majority of the molluscs died in a few days after the addition of infected urine.

Experiments are now being undrtaken to collect cercariæ from naturally infected snails and to infect guinea-pigs with them.

The Binonomics and Distribution of Isodora Ovoidea in Zanzibar.—This molusc has been found in most of the swamps, ponds and, at times, in the backwaters of rivers. An essential seems to be a muddy bottom and still water.

They are generally found in abundance on the underside of water-lily leaves and attached to the stems of a species of papyrus. At times when in profusion they attach themselves to any drift-wood or convenient foliage. I have never found them in rivers or swiftly moving water. At certain seasons of the year they are very abundant, generally in the cold weather. The same swamp revisited after a few months in the hot season was practically negative. They have been found in every district of the island.

Schistosomiasis due to Schistosomum Mansoni.—Seven cases out of 1,088 fæcal examinations showed lateral spined ova. All cases were mainlanders, five of them police constables. During the present investigations, extending over two years, no case of infection has been recorded in an indigenous native. As mentioned in the previous reports, the only species of Planorbis recorded is Planorbis gibbonsi, which is not widely distributed in the island.

GENERAL CONCLUSIONS AND RECOMMENDATIONS ON HELMINTHIC INFECTIONS IN THE ZANZIBAR PROTECTORATE.

Ankylostomiasis.

1. The incidence of Ankylostomiasis in the Protectorate by smear and flotation methods is 95 per cent.

2. The average number of ova per gramme for all groups of natives investigated is between 3,000 and 4,000.

In the report for 1927, the number of worms per group was quoted. On further study, it has been decided that the conditions as found by Chandler in Bengal approximate to those in Zanzibar, that is to say about 80 per cent of Necators are found.

It has been estimated that where Necators are 80 per cent of the total of worms, 25 ova per gramme in mushy stools represent one female worm.

The average ova per gramme in Zanzibar is 3,377.5 in formed stools. This corresponds to 1,688.8 ova per gramme in mushy stools,

and therefore represents 67.6 female worms. Further, it has been found from stool washings and post-mortem records that in Zanzibar there are twice as many female as male worms harboured, so that our estimated total average worm count becomes $67.5+33.8=101.3$.

Tentatively working on this deduction, it may be inferred that the average number of worms harboured by the natives of Zanzibar is in the region of 100.

It is considered that the statement of eggs per gramme gives a better basis of comparison than does an estimate of the number of worms present.

3. Generally, persons showing over 10,000 ova per gramme show definite clinical symptoms.

4. Perhaps the local native has attained some sort of natural immunity.

5. Soil pollution is rife throughout the Protectorate. Generally pollution is very scattered, communal defæcating grounds, with one exception, do not exist. The most favoured sites are banks of streams, dry river beds, copses, etc.

6. It has been proved by experiment that all Zanzibar soils are suitable for the growth of hookworm larvæ, as long as the necessary amount of shade and moisture is present.

7. Sea beaches, much favoured sites for defæcation, can be infective for short periods according to conditions. For instance, ordure placed above high-water mark with light shade is capable of producing ripe hookworm larvæ.

8. Privy pits constructed with earth tops are infective.

9. The creek, for some unknown reason, is not infective.

10. The rate of infection varies in different parts of the Protectorate. Generally speaking, the north-west areas are heavily infected, the southern portion of the island much less so.

11. All sexes are equally infected; children between the ages of 8 and 15 in parts of the island show heavy infections.

12. Occupation does not seem to have much bearing on the disease; all classes of the population contract the infection from time to time. This may be explained by the fact that most of the males work as clove pickers at certain periods. In clove plantations the conditions for contracting the disease are favourable.

13. *Climatic Conditions in Relation to Hookworm Infections.*—From the three tables given it will be seen that the climatic conditions of Zanzibar are extremely suitable for the development of hookworm larvæ. Most of the rain falls in the months of April, May, November and December. There are no long periods of drought. The mean maximum temperature is about 84.5, the mean minimum is about 76.5.

As previously mentioned, the soils of the Protectorate have shown themselves to be suitable breeding grounds for hookworm larvæ.

Zanzibar (Town).

Temperature of the air.	1892-1926.	1927.
Mean of daily maxima F.	84.5	84.6
Mean of daily minima	76.5	76.4
Mean of daily range	8.0	8.0
Mean	80.5	80.5
Rainfall (inches)	59.43	70.53
Rainy days	100	140

TABLE I.

Annual Rainfall (in inches) for the decade 1914-1923.

Zanzibar.

Year.	Zanzibar Town.	Mkokotoni.	Chwaka.
1914	42.94	62.99	41.50
1915	51.62	52.87	50.11
1916	63.49	49.12	54.14
1917	57.06	74.46	51.43
1918	56.50	51.77	47.04
1919	47.98	55.76	39.91
1920	44.03	47.56	39.01
1921	49.71	67.55	51.22
1922	53.55	60.20	48.77
1923	57.25	54.17	33.40
Average for decade	52.51	57.64	45.64

Rainfall, Zanzibar Town, 1928.

January	4.24	July	0.00
February	5.30	August	1.19
March	11.18	September	1.68
April	10.04	October	1.68
May	7.69	November	18.95
June	4.01	December	2.77
		Total	67.83

14. *Footgear.*—The wearing of shoes has an important influence on the amount of hookworm infection, but in most parts of the Protectorate, where climatic conditions are favourable, shoes are rarely worn except on special occasions.

15. It was the general opinion that hookworm was one of the major diseases of the island, and that it accounted for much sickness and the general lethargy of the Swahili.

The present investigation has shown the high incidence of the disease, but on studying the quantitative distribution the outlook does not seem to be so serious.

Undoubtedly, the disease requires investigation from a medical point of view, correlated with the study of quantitative infection.

Recommendations.

1. The ideal to be worked for is the prevention of soil pollution; in no place where climatic conditions are suitable will the disease be done away with until this ideal is reached.

It is hoped that the new Public Health Decree now under consideration will effect great improvement by enforcing the provision of standard cement covered latrines to all new houses throughout the island.

A certain portion of the community will always resort to promiscuous defæcation, but in time this should be negligible.

2. In all probability, those heavily infected will find their way to a central hospital or one of the district dispensaries. It is the heavily infected cases which keep soil pollution alive. The opening of new district dispensaries will undoubtedly lessen the incidence of the disease.

3. The construction of public latrines of approved types in the town and other centres will do away with much soil pollution.

4. In certain villages the natives should be encouraged to defæcate in places which are exposed to the full heat of the sun, such as sea-beaches, etc., and not to select shady places.

5. *Propaganda.*—This may be in the future one of the best means of combating the disease. The African is susceptible to instruction, and willing to learn. He well knows the disease and many of its symptoms. General instruction in the etiology of the malady will have far-reaching effects, especially if the young generation is brought up with some idea of modern sanitation.

6. Mass treatment given during the time that sanitary improvements are being made will undoubtedly have beneficial effects. This, if carried out in the heavily infected parts of the island, such as the north-west, and at the right season of the year (during the dry weather), should do much to improve the situation.

Ascariasis.

1. The incidence of this disease is 27.3 per cent.

2. In the southern parts of the island the disease is very prevalent. In some villages the incidence was found to be over 80 per cent. This may be accounted for by the use of open wells, which could be easily infected. The climate of this region is dry, and strong winds prevail, favouring the dispersion of Ascariad ova.

3. The examination of the fæces of wild pigs shows that they harbour the ova of an Ascarid.

I take A. suilla to be a synonym of A. lumbricoides.

4. Males, females and children are equally infected.

Recommendations.

1. The wells in the southern districts of the island should be adequately protected against contamination.

2. The native dispensers in these districts should carry out a campaign against these worms by means of suitable drugs.

Trichuriasis.

Trichuris trichura is one of the commonest parasites of man in Zanzibar. The incidence is 72.1 per cent.

Tæniasis.

Is practically unknown. A few natives from the mainland are infected with T. saginata, owing probably to eating raw or improperly cooked meat. The natives of Zanzibar eat little meat, and when used it is cut into small pieces and well cooked.

The Veterinary Division condemns a number of cattle carcasses annually for infection with Cysticercus bovis; local animals as far as is known, are not infected.

Bilharziasis.

1. Out of 411 local school children examined, 87 showed ova of S. hæmatobium in their urine or an incidence rate of 21.1 per cent.

The children were drawn from all parts of the island. The average age was from 6 to 12 years. The majority of the children had never left the island. This proves that the disease can be contracted locally.

2. The disease varies in intensity in different localities. The north-west portion of the island is most heavily infected.

3. From evidence collected the presumable molluscan carrier is Isodora ovoidea.

This snail is widely distributed in the island, being found in most of the swamps and backwaters of rivers.

Recommendations.

1. Destruction of the adult worms in man by means of suitable drugs.

2. Destruction of the intermediary mollusc by chemicals such as Copper Sulphate.

Use of local poisonous plants, such as a species of Tephrosia: it is common and used by the natives as a fish poison.

Clearing of favourite food plants from swamps, such as water-lilies.

Encourage the natives to keep ducks; they are known to feed with avidity on snails.

In certain areas the construction of snail-proof bathing pools for the children. These measures should be carried out in heavily parasitised places.

3. *Propaganda.*—Short, concise pamphlets dealing with the disease and its etiology. The danger of bathing and washing clothes in swamps should be stressed.

The habit of urinating in swamps should be discouraged.

Measures Adopted During the Past Year.

In connection with the varied helminthic and other parasitic diseases in the Protectorate, team work has been undertaken with the Resident Surgical Officer and the Bacteriological Division.

Groups of natives, such as police constables, schoolboys, etc., were examined.

The Biological Division carried out the following investigations:—

Ankylostomiasis: Number of eggs per gramme.

Ascariasis: Incidence.

Schistosomiasis: Incidence.

Filariasis: Incidence for Mf. bancrofti.

Malaria: Parasite index.

The Bacteriological Division:—

Hæmoglobin Index.

Blood: Estimation of red and white cells.

Wasserman Reaction.

Examination of Urine: Diacetic acid, sugar and albumen.

The Resident Surgical Officer:—

A general medical examination.

The three officers worked independently, and, when one group of natives was finished, a meeting was held and the results compared.

It is hoped by this team work to come to some conclusion as to which of the many tropical diseases so common in Zanzibar are really responsible for the supposed general unfitness of the Zanzibari.

Propaganda.—Much work has been done during the year on this important subject. Ankylostomiasis and Schistosomiasis were especially taken into consideration.

In connection with hookworm, a series of lectures and demonstrations were given in different district schools, the Central School, and to groups of police constables.

The lectures consisted of short talks with the following demonstrations:—

Microscopical demonstration of ova of hookworm prepared direct from fæces in the presence of the pupils, and of living hookworm larvæ. Adult worms preserved in spirit and mounted on black slips.

Microscopical demonstration of bilharzia ova prepared in the presence of the pupils from blood-stained urine; all of them connect this type of urine with the disease. Living specimens of Isodora ovoidea were also shown and at the same time other common molluscs as incapable carriers.

I feel confident that such demonstrations have aroused interest and created healthy discussion regarding the disease under review.

Two short, concise pamphlets have been published in the vernacular on hookworm and bilharzia for distribution throughout the island. Lectures with magic lantern slides have been delivered by one of the school teachers on hookworm. All district schools were visited, and the attendance of the pupils' parents was most satisfactory.

It is hoped in the near future to make slides, using as much local colour as possible. Slides depicting hookworm as it occurs in America does not appeal to the public.

The general public and school pupils are able to see in the Zanzibar Museum the majority of the commoner local diseases graphically arranged.

The Curator has given demonstrations from time to time to various groups of pupils from schools representing the varied communities of cosmopolitan Zanzibar. In most instances they were accompanied by their own masters, who set questions at a later date on the diseases demonstrated.

The Zanzibar Museum has a good lantern and a daylight screen, which has enabled demonstrations to be given in semi-daylight.

Fleas.

A survey was started in 1927 to ascertain the species of the common rat fleas and their monthly incidence.

The table on the following page shows the results tabulated monthly.

Rat and Flea Record, Zanzibar Town, July 1927—July 1928.

	1927						1928						Total for twelve months.
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	
Total number of rats	19	33	37	24	21	17	6	15	14	16	17	25	244
,, ,, ,, E. norvegicus	7	24	28	14	9	10	3	7	10	6	1	7	126
,, ,, ,, R. rattus	11	9	9	10	12	7	3	8	4	10	16	18	117
,, others	1	0	0	0	0	0	0	0	0	0	0	0	1
,, fleas	95	191	289	100	223	92	61	120	71	104	44	76	1466
,, number of cheopis on rattus	53	56	54	12	52	12	9	5	12	27	16	20	328
,, ,, ,, brasiliensis on rattus	10	25	15	23	21	14	1	30	9	26	28	37	239
,, ,, ,, cheopis on norvegicus	30	93	130	52	123	27	45	77	34	16	0	15	642
,, ,, ,, brasiliensis on norvegicus	2	17	86	13	27	39	4	7	16	6	0	4	221
,, ,, ,, astia on norvegicus	0	0	4	0	0	0	0	1	0	0	0	0	5
,, ,, ,, astia on rattus	0	0	0	0	0	0	0	0	0	0	0	0	0
,, ,, ,, other fleas	0	0	0	0	0	0	2	0	0	29	0	0	31
Average number of fleas per rat	5	5.7	7.8	4.1	10.6	5.4	10.2	8	5.1	6.5	2.6	3	6.2

Total number of X. cheopis	...	970
Total number of X. brasiliensis	...	460
Total number of X. astia	...	5
Average number of X. cheopis on R. rattus	...	2.8
Average number of X. cheopis on E. norvegicus	...	5.09
Average number of X. brasiliensis on R. rattus	...	2.03
Average number of X. brasiliensis on E. norvegicus	...	1.7

From these records the rarity of Xenopsylla astia is an outstanding feature of the flea fauna. With an equable climate like that of Zanzibar, showing a mean daily range of temperature of 8° only, there is no marked seasonal variance in the average number of fleas per rat.

W. MANSFIELD-ADERS.

Economic Biologist.

(B) INVESTIGATIONS UNDERTAKEN IN WETI DISTRICT, PEMBA.

Ankylostomiasis and Clinical Anæmias.

Clinical ankylostomiasis is generally associated with anæmia of a greater or less degree, so much so that blanched conjunctivæ, associated with buzzing in the ears, are almost regarded as pathognomonic.

It had been noted, however, that many of these cases did not react to treatment, while others commenced to improve from the outset. Cases of beriberi have not been uncommon in both islands, and particularly in Pemba, so it was thought that some of the cases might be due, at least in part, to the deficiency of some vitamin or accessory food factor.

With this in view, and as a starting point, a number of these anæmias were collected and divided into two groups according to the number of hookworm ova per gramme of fæces. A group of normal people had first been taken and the ova counts estimated. These were found to vary from 300 to 8,000 per gramme, giving an average of 3-4,000 ova per gramme of fæces.

The two groups were as follows:—

Group "A".—Those cases which were regarded as being definitely due to hookworm, *i.e.* those showing more than 10,000 ova per gramme.

Group "B".—Those in which the ova count was very much below this figure, and which were suspected of being due to some other cause.

In all cases the length of time under treatment was carefully noted.

Those in Group "A" were given Treatment "A".

Those in Group "B" were given Treatment "B".

The period during which the patient was under treatment was recorded, and, as far as could be judged, the condition of all patients on admission and on discharge was fairly uniform, and a fair index of the result of the treatment. The treatments were as follows:—

Treatment "A":—

This was given to cases showing a heavy ova count.

Full hospital diet (see below)*.

An Iron and Arsenic tonic mixture, three times daily.

Oil of Chenopodium m xx weekly, for three doses.

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*Hospital Diet.

Natives—

Bread	5½ ozs.	Rice	1⅓ lb.
Sugar	2 ozs.	Dhall	2 ozs.
Milk	4 ozs.	Salt	½ oz.
Tea	¼ oz.	Curry	1/16 ozs.
Beef or fish	6 ozs.	Coconut	1/6
Vegetables	1½ ozs.	Flour	1 oz.

My own experience tends to make me believe that three doses given at weekly intervals are sufficient. The first dose removes about 93½ per cent of the worms, the second, a further 3.4 per cent, and the third a further 1.2 per cent, leaving a residue which is not appreciably diminished even by a further three or four treatments.

Treatment "B":—

This was reserved for those with a very low ova count, and was given on the assumption that these cases were caused by a food or vitamin deficiency.

Full hospital diet (less half the usual amount of rice).

Raw egg in milk. Vegetables as available; beans were most commonly used.

Fruit—oranges, pineapples, mangoes and papayi were usually obtainable at one time or another.

Marmite 1.5 gms. daily.

Analysis of these cases gives the following data:—

Total number of cases	30
Group "A"—Number with more than 10,000 ova per gramme	17
Group "B"—Number with less than 10,000 ova per gramme	12
Borderline cases—regarded as doubtful	1
Length of time under treatment—	
Group "A" Heavy infections	55.18 days
Group "B" Light infections	23.34 days

Summary and Conclusions.—While acknowledging that these cases are too few in number to warrant any definite assertions, it would appear that in Pemba, at least, the cases of clinical "ankylostomiasis" are due only in part to this disease and in part to some other factor or condition. Neither time nor sufficient cases have as yet permitted me to reverse the experiment, treating the heavy infections with the anti-deficiency diet and the light ones with the ankylostome treatment. This I hope to accomplish some time in the future.

The rapid recovery of some cases when put on a good diet strongly suggests the inadequateness and possible deficiency of the common native diet, but whether this is a deficiency in quality and quantity or in vitamin content remains for the moment undecided.

Malaria.

Malaria is still one of the common diseases among the natives, ranking with filariasis and ankylostomiasis. As will be seen from the results recorded below, the parasite rate is high, but during the two months when the children were examined malaria was particularly prevalent. Also the number examined is too small for a true

estimation. The children were those attending the two schools in the district, one in the township area, and one in the country 8 miles distant.

Town children examined	58
Number showing parasites	19
Number negative	39
Parasite rate	32.89%
Country children examined	18
Number showing parasites	7
Number negative	11
Parasite rate	38.77%

Of those which were positive the great majority were benign tertian infections.

Total number positive	26
Benign tertian	22
Subtertian	2
Quartan	nil
Undefined	2
Average age of town children	9.8 years
Average age of country children	9.5 years

Mosquitoes.

The four main swamps around Weti township constitute a permanent breeding ground for mosquitoes of many kinds, but particularly for certain species of Anopheles and Culex; the permanent drainage of these will be commenced early this year, after which the incidence of malaria is expected to fall considerably.

A collection of mosquitoes has been made and sent to London for identification, and a complete list will be published at a later date.

Representatives of the following genera have been noted; species are mentioned only where definitely known:—

Anopheles—
- A. funestus
- A. costalis
- A. maculipalpis

Culex
Aedes
Ochlerotatus
Tæniorhynchus

Anopheles costalis is the most common Anopheline found in the houses, A. funestus being comparatively rare, while on two occasions A. maculipalpis was found by the Medical Officer in his own house.

In one section of the "market swamp", where Anopheline larvæ may always be found, and where a circular ditch collects seepage water from the surrounding slopes, only A. maculipalpis was found breeding, but never any other species.

From this area the following mosquitoes were bred out:—

Number of larvæ collected	217
Number of A. maculipalpis	213
Number of others (Culex)	4

Tæniorhynchus.—These mosquitoes are very troublesome during the two or three hours following sunset, when they appear in and around houses and bite viciously. The prevalence of this mosquito appears to be periodic, but as yet no definite seasonal periodicity has been determined.

Ochlerotatus.—This genus provides another determined biter, which chooses daylight as well as the early hours of the night for attack. It is extremely difficult to suppress, as it breeds almost entirely in the crab-holes along the edges of the mangrove swamps and in those on the foreshore around high water mark.

Bilharziasis.

A routine examination of the urines of native children and adults taken at random, and regarded as normal people, shows that this disease is very widespread and much more prevalent than has hitherto been supposed.

Tabulated results are as follows:—

Total number examined	127
Total number showing ova of S. hæmatobium	46
Percentage infected	36.22

Township area as opposed to country district:—

Township area—	
Number examined	40
Number positive	7
Percentage infected	17.5
Country district—	
Number examined	87
Number positive	39
Percentage infected	44.59

Further division into groups according to age, gives the following results:—

Age.	Number examined.	Number positive.	Percentage.
5—10 years	44	14	31.82
11—15 ,,	34	15	44.12
16—35 ,,	30	14	46.67
35—55 ,,	19	3	15.79

Each person examined was asked if he had noticed any peculiarity about his urine. Those who complained of frequent and painful micturition or of a blood-stained urethral discharge were marked for special observation. The others showed no signs and were apparently normal and healthy.

Number examined	127
Number complaining	15
Number showing blood in urine	10

One man who complained of symptoms showed nothing in his urine: it was perfectly normal in every respect.

Following these clinical observations, a systematic search of all swamps and bathing places was instituted to discover, if possible, the intermediate molluscan host of Schistosomum hæmatobium in Pemba. As a definite mollusc had been found in Zanzibar, this particular one was kept in mind. The following fresh-water molluscs have been found up to the present time, and there are probably others: —

Lanistes purpureus
Melania amarula
Ureodoxis (Neritina) gagates
Isdora ovoidea
Planorbis gibbonsi
Meladomus olivaceus
A small limpet like variety

Of these, the most common are Lanistes and Melania, both of which occur in profusion everywhere.

Isodora occurs in shallow marshy pools, and is generally found on the under side of the leaves of the common blue water-lily. Many of these were taken and examined for cercariæ. At first 100 snails were placed in a large glass tube with fresh water: The tube was then examined daily with a lens for cercariæ. On the second day one was seen.

A fresh batch of snails was then taken, ten being placed in each glass tube. Each tube was then examined daily for a week or until the snails died—which was generally after five or six days. When a tube showed cercariæ, the ten snails were then removed and dissected to find the one or ones infected. In this way a considerable number could be dealt with quite readily.

Snails observed and dissected	390
Number infected	7
Percentage infected	1.79

This figure may not be strictly accurate, as only a small lens was used for the examinations, there being at the time no dissecting microscope available. However, the fact remains that the natural infectivity of these snails is very low.

None of the others has ever shown cercariæ.

Summary and Conclusions.—From the above data two points stand out very clearly, viz: —

1. The prevalence of the disease and its wide distribution.
2. The rarity with which patients appear complaining of the disease.

The disease would appear to be contracted chiefly during childhood, and, to some extent at least, appears to wear off with advancing years.

When discussing the matter with the natives themselves, concerning the possible means by which the pools may become infected, I have been told that the average adult will not as a rule micturate in bathing or general washing pools.

In most instances they will generally admit that the children, who spend a very large portion of their time playing in the water, sailing small canoes, etc., will micturate in the water.

On reaching adolescence, bathing in these pools becomes a business rather than a game, and though the infection appears to be very great, it has, I think, reached its maximum height. From this time onward the chances of reinfection diminish, and the percentage of infected persons drops from 46.67 in the adult group, to 15.79 in the middle-aged group.

From these figures one can infer two possible explanations:—

(*a*) That the disease tends to die out of its own accord as age advances, provided that no reinfection occurs.

(*b*) That the disease is of but recent introduction, say within the last 15 years.

The facts as they stand will support both theories, but against the latter is the story of the natives themselves. Many of the old men with whom I have talked have admitted that many years previously they were troubled with the disease but that now it had disappeared, having gradually "worn off". While admitting the vegueness of the native mind both for time and for events, it seems reasonable to believe that in some cases at least the disease is capable of spontaneous cure, so that the first theory is probably correct.

That the small degree of sanitation and sanitary living in the township areas has a definite and beneficial bearing on the incidence of the disease may also be seen from the figures, as in the town areas 17.5 per cent are infected compared with 44.59 per cent in the districts. The difference is considerable.

Discussion and Recommendations.—Though the disease is so common among the people, it does not appear to cause much disability, except, perhaps, when the infection is very heavy. In view of this, coupled with the difficulty in getting natives to attend for treatment regularly over a period of two or three weeks, any attempt at mass treatment would be ineffective and futile. Also, any attack directed at the snail itself would be very costly and probably in vain.

There is also the idea of building bathing places for the use of children, but I feel sure that the great majority of children much prefer to wallow in a mud hole than to play in a clean hole which has been specially made for them, while native parental control is not likely to enforce what the adult mind but indefinitely understands.

There is left to us but one weapon, viz., propaganda, and, knowing the good results following education on the subjects of both malaria and ankylostomiasis, I am certain that popular lectures and lantern

demonstrations by trained natives would do more in a few years towards eradicating the disease than would a mint of money spent in attacking either the trematode itself or its intermediate host.

Filariasis.

The following gives some idea of the position with regard to filariasis.

Mosquitoes were caught by the mosquito searcher and were dissected for the presence of filaria.

Mosquito.	Number dissected.	Number positive.	Percentage.
Culex	96	8	5.31
Aedes	72	3	4.17
Anopheles	58	1	1.72

Blood films stained with Giemsa's stain were examined as follows:—

Adults:

Total blood films	156
Total showing micro-filaria	36
Percentage	23.08

Children:

(*a*) *Township.*

Average age. 9.84 years	
Number examined	58
Number positive	9
Percentage infected	15.52

(*b*) *District.*

Average age. 9.56 years	
Number examined	18
Number positive	3
Percentage infected	16.66

Films were taken from the adults at 9-30 p.m., but from the children at 7-30 p.m. owing to the difficulty in getting them to come later, their figures are probably a little low.

It is rather remarkable, with so high a blood infection, that cases of filariasis and elephantiasis should be so comparatively uncommon.

Ascariasis.

Ascaris is not nearly as common as it is in Zanzibar. This is probably due to the greater degree of moisture in Pemba with the consequent diminution in the pollution of wells by infected dust.

The school children were again taken and examined. The incidence is slightly higher for the country children than for those in the town.

Town:

Number examined	58
Number positive	11
Percentage	18.96

Country:

Number examined	18
Number positive	4
Percentage	22.23

Trichuriasis.

Though this is almost universal among the natives, one is never called upon to treat the condition, and it appears to cause no inconvenience to its host. Country children again show a higher degree of infection.

Town :	
Number examined	58
Number positive	28
Percentage infected	48.27
Country :	
Number examined	18
Number positive	11
Percentage infected	61.12

Rats and Fleas.

During the last six months of the year rats were caught to determine the species of fleas existing on Pemba rats, and to work out the flea index to estimate the danger of plague introduction. The examinations were done regularly from June until December inclusive, and the following data were obtained: —

(*a*) *Rats.*

A classification of the various species of rats caught in Weti is given below. These rats were caught in godowns, clove sheds and bakeries, a few only being caught in houses. Epimus norvegicus occurred only in the godowns and those houses of which the rear premises overlook the market swamp into which the drainage flows.

Total number of rats caught	176
Total number of Ep. norvegicus	20
Total number of Rattus rattus	156

The various species of Rattus rattus were apportioned as follows: —

R. rattus rattus	13
R. rattus frugivorus	139
R. rattus rufescens	4
Total	156

(*b*) *Fleas.*

The following tabulation gives the number of fleas per rat per month, with the species of flea caught: —

Total number of fleas	571
Total number of X. braziliensis	570
Total number of X. cheopis	1
Total number of X. astia	nil
Total others	nil
Average number of fleas per rat	3.24

It is rather strange that only one X. cheopis was found, since, in Zanzibar, cheopis constitutes a little more than half the number of rat fleas, braziliensis coming a close second. Echidnophaga has not yet been found, though in Zanzibar, it is not uncommon.

The only other fleas which have as yet been found in Pemba are:—

1. Ctenocephalus, of which two species occur, viz:—

Ct. canis.
Ct. felis.

2. Sarcopsylla (definite species not determined).

A systematic table summarises them thus:—

1. Pulicidæ—

(*a*) Xenopsylla:

X. braziliensis.
X. cheopis.

(*b*) Ctenocephalus:

Ct. canis.
Ct. felis.

2. Sarcopsyllidæ—

(*a*) Sarcopsylla.

RAT AND FLEA RECORD, WETI, JUNE-DECEMBER, 1928.

	1928.						
	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Total number of rats	13	69	19	26	14	19	16
,, ,, ,, E. norvegicus	0	12	0	0	3	5	0
,, ,, ,, R. rattus	13	57	19	26	11	14	16
,, others	0	0	0	0	0	0	0
,, fleas	49	242	33	55	72	81	39
,, number of cheopis on rattus ..	0	1	0	0	0	0	0
,, ,, ,, brasiliensis on rattus ..	49	202	33	26	47	53	39
,, ,, ,, cheopis on norvegicus ..	0	0	0	0	0	0	0
,, ,, ,, brasiliensis on norvegicus ..	0	39	0	29	25	23	0
,, ,, ,, astia on norvegicus ..	0	0	0	0	0	0	0
,, ,, ,, astia on rattus ..	0	0	0	0	0	0	0
,, ,, ,, other fleas	0	0	0	0	0	0	0
Average number of fleas per rat	3.77	3.51	1.74	2.12	5.14	4.29	2.44

D. D. McCARTHY, M.B., Ch.B. (N.Z.),
Medical Officer, Weti.

(C) BACTERIOLOGICAL LABORATORY REPORT.

1. Zanzibar.

The amount of work done maintained the average previous years, though the total number of examinations carried out did not reach the high level of 1927. But, since the vast majority of work is performed for the Government Hospital, the number of examinations depends largely both on the inclination of the officer-in-charge to utilise laboratory methods in diagnosis and on the type of cases that present themselves to him for treatment.

The water supply at Bububu was examined bacteriologically every month and gave, on the whole, quite satisfactory results.

Blood sugar estimations to the number of 125 (Maclean's method) were carried out, and as a result of practice it has been found that the time taken to complete a test does not exceed fifteen minutes. Gas not being available, some difficulty has been found in standardising a spirit bunsen flame for use in the test, and this point continues to give a certain amount of trouble and requires very frequent checking.

Examinations of blood slides for malaria parasites numbered 3,647. Of 1,148 found positive, 50 per cent were benign tertian.

A slightly smaller number of school children than last year were examined for malaria parasites, but the number found positive was greater than last year, the percentage being 18.9 as against 13.8 in 1927.

Widal's test for the enteric group was carried out on 46 specimens of blood, of which 12 proved positive for B. paratyphosus B in high dilutions. Though undulant fever is not known to be present in this Protectorate, it was decided, on account of its clinical similarity to the paratyphoids, to carry out agglutination tests with stock suspensions of B. melitensis on all serums submitted for Widal's test. This was done, but in each of the forty-six cases mentioned above the result was negative.

Cytological examinations of blood, other than examinations for parasites, amounted to 402, being considerably over twice the number carried out in the previous year.

Fifty specimens of fæces were submitted for examination for bacillary dysentery and of these 15 were positive—ten for B. dysenteriæ (Flexner) and five for B. dysenteriæ (Shiga).

Five specimens of fæces were submitted for examination for the enteric group, and of these one proved positive for B. paratyphosus B.

All cultural examinations for the enteric and dysentery groups were confirmed by agglutination tests with the appropriate sera.

Sputums examined for B. tuberculosis numbered 287, of which 81 or 28.2 per cent were positive.

A rough examination with a view to finding out the possible presence of pathogenic intestinal bacteria (*i.e.* members of the enteric and dysentery groups) in the dust of Mji Mpia Dairy site was carried out, but with negative results.

The method employed was to collect, in sterile test tubes, approximately one gram of dust from the surface of the sandy oil of the dairy in twenty evenly distributed places.

This 20 gms. of dust was then placed in 100 c.c. of MacConkey's liquid medium and incubated for 24 hours. Plates of MacConkey's solid medium were then sown from the 24 hours broth culture, and, after 24 hours growth, specimens of all the lighter coloured colonies (15 pale-pink to almost colourless colonies) were picked off and sub-cultured on agar slopes. From 24-hours-old agar slopes, sub-inoculations were made in the following sugars: Lactose, Mannite, Dulcite, Maltose, Saccharose, Glucose, Dextrin, Inosite, and also in Litmus Milk.

After 24 hours growth any specimens showing acid and gas in lactose, and acid and clot, or clot in litmus milk, were discarded. The remainder were examined again after a further period of 24 hours, and subsequently every 24 hours for six days, and at each examination any specimen showing lactose fermentation or acidity was discarded.

No non-lactose fermenting organisms, with the exception of Castellani's B. paradysentericus, were found, though all the usual intestinal bacteria were present in abundance.

At the end of the year the typing of blood of African natives was begun, but sufficient data has not been collected to include in this year's report.

The preparation of precipitin for the identification of human blood was also begun at the same time, but the first batch of serum will not be ready until January.

In conjunction with the Resident Surgical Officer and Economic Biologist, a series of examinations were made with a view to ascertaining the cause of the supposed physical unfitnes of the Swahili native. This laboratory investigated the blood and urine conditions. The blood examination included red and white cell counts, hæmoglobin percentage, and blood sugar percentage, the urine was examined for diacetic acid, sugar, and albumen. This investigation is still in hand.

J. M. SEMPLE,

Acting Deputy Director of Sanitary Services.

BLOOD.

Total :—4450.	Positive.	Negative.
Sugar estimation ...	125	0
Spirochæta obermeieri ...	2	1
Filaria ...	13	27
Differential count ...	131	0
Hæmoglobin ...	123	0
Hæmoglobin, colour index ...	3	0
Red cells count ...	135	0
White cells count ...	10	0
Wassermann test ...	69	112
Myeloid leukœmia ...	0	2
Widal's test:— ...		
B. typhosus ...	0	34
B. paratyphosus A ...	0	
B. ,, B ...	12	
Cul. exam. for streptococci ...	0	2
Cul. exam. for staphylococci ...	1	1

	Un-defined	S. T.	B. T.	Q.	Neg.
*Malaria	454	116	574	4	2,499

SPUTUM.

Total :—291.			Positive.	Negative.
Tubercle bacilli ...			81	206
Spirochæta bronchialis ...			4	0

Fæces.

Total :—1,098.			Pos.	Neg.
Amœbæ	E. histolytica	15	22	93
	A. coli	7		
Ankylostoma ...			540	291
Ascaris ...			35	10
Tænia	solium	5	6	7
	saginata	1		
Bilharzia ...			8	5
Trichuris ...			17	0
Giardia intestinalis ...			3	0
Oxyuris vermicularis ...			0	1
Blood ...			0	2
Flora ...			0	1
Cul. examination for B. dysenteriæ	B. flexner	10	15	35
	B. shiga	5		
Cul. exam. for B. paratyphosus B. ...			1	4
Routine examination in Black water fever cases			2	0

URINE.

Total :—1237.	Positive.	Negative.
Sugar ...	46	121
Albumin ...	21	92
Bilharzia ...	50	59
Gonococci ...	55	82
Diazo reaction ...	2	1
General examination ...	570	0
Diacetic acid ...	7	103
Acetone ...	1	2
Casts ...	0	2
Spermatozoa ...	1	6
Leptospira hebdomadalis ...	0	2
Uric acid estimation ...	1	0
Cul. exam. for B. coli ...	3	8
,, ,, ,, B. typhosus ...	0	2

Nasal Secretion.

Total :—46.	Pos.	Neg.
B. lepræ ...	8	38

*This includes the routine examinations, numbering 1,087, of school children, out of which 205 were positive but undefined parasites and 882 were negative.

RAT EXAMINATION.

Total:—3484.	Pos.	Neg.
B. Pestis ...	0	3484

Miscellaneous. Total:—75.	Pos.	Neg.
Smear from sore, Spirochæta pallida ...	3	52
Brain smear for meningococci ...	0	1
Cerebro spinal fluid for differential count ...	1	0
,, ,, ,, ,, globulin ...	1	1
,, ,, ,, ,, white cells count ...	1	0
,, ,, ,, ,, bact. exam. Gram negative bacilli ...	1	0
Eye smear for gonococci ...	0	2
Pus smear for Gram negative bacilli ...	1	0
Pus for Gram positive diplococci & staphylococci ...	1	0
Smear from gum for Vincent's angina ...	1	0
Nasal discharge for micrococci catarrhalis ...	2	0
Ear ,, ,, staphylococci ...	1	0
Breast Milk for fat estimation ...	1	0
Tonsils for gangrenous cells ...	0	1
Cul. exam. fluid from hydrocele for micro-organisms ...	0	1
Cul. exam. fluid from lung ,, ,, ...	0	1
Cul. exam. scales from hand ,, ,, ...	0	1
Cul. exam. pus for staphylococci ...	1	0

VACCINES.

Total:—26.	Number.
Staphylococci ...	8
Gonococci ...	2
Streptococci ...	1
B. flexner ...	1
Micrococci catarrhalis ...	3
Pyorrhea ...	1
Polyvalent ...	10

Pathological Examination

Total:—4.	Pos.	Neg.
Gumma of testicle ...	1	...
Sarcoma ...	3	...

CHEMICAL.

Total:—111.	Number.
Milk fresh ...	11
Milk condensed ...	4
Water ...	66
Legal cases ...	27
Butter ...	1
Ghee Cutch ...	1
Ghee Bombay ...	1

2. Chake Chake Laboratory Return.

Blood Total:—408.		Fæces Total:—430.		Sputum Total:—48.			Urine Total:—346.	
					Positive	Negative		
B. T. Parasites	92	Ankylostoma ova	245					
S. T. ,,	173	A. D. and Strongyloides	39					
Microfilaria	3	A. D. and Trichuris trichiura	31	Tubercle bacilli ...	17	25	General examinations	161
Negative	140	Strongyloides only	21	Pneumococci ...	2	4	Schistosoma ova present	183
		Trichuris trichiura only	18				Microfilaria in urine	1
		Ascaris	6				Microfilaria ond Schistosoma ova	1
		Schistosoma mansoni	2					
		Negative	68					
				Nasal secretion Total:—12			Microfilaria in hydrocele fluid	1
					Positive	Negative		
				B. lepræ	3	9		

3. Weti Laboratory Return.

Blood	Faeces	Urine	Urethral Discharge
Total:—403	Total:—527	Total:—106	Total:—58

Further details are included in the Scentific Report of the Medical Officer, Weti (page 71).

(D) INTERESTING CASES.

A CASE OF GAS-GANGRENE,

With a Brief Reference to Diagnosis and Treatment.

By Dr. D. D. McCarthy, M.B., Ch.B. (N.Z.).

Cases of Gas-gangrene are of sufficient rarity and interest in Zanzibar, and perhaps in East Africa, to warrant publication.

On the afternoon of Wednesday, October 24th, a native boy, seven years of age, was admitted to the Weti Hospital suffering from a compound fracture of the right arm about two inches above the wrist. The injury was the result of a fall that morning from a tree. On examination, the shaft of the radius was protruding one inch from a small transverse wound on the anterior surface of the forearm. The ulna was also fractured at the same level. The exposed portion of the bone was covered with soil and dirt, having evidently been driven into the ground by the force of the fall.

The child was prepared for operation immediately, chloroform being the anæsthetic used throughout.

The end of the radius was cleaned thoroughly, and all the dirty fragments of tissue were removed. The wound was enlarged by a longitudinal incision, which made with the original injury a T-shaped wound; the depths of the wound were carefully cleaned, and the cavity swabbed out with carbolic lotion 1/80, then with spirit and finally with iodine. The fractures were reduced without difficulty; fixation was obtained by a straight back splint, while the wound in front was left open for drainage and covered only with sterile dressings. At the same time 1,500 units of A.T.S. were given.

The following morning the temperature was 102.4° F. and pulse rate 96. The wound was clean, but the blood showed malarial (benign tertian) parasites, so quinine gr. vii was ordered thrice daily. The next morning the temperature was normal, but rose at night to 103° F. and pulse rate to 100. For the first time the wound did not look clean and healthy, the edges being greyish in colour, while the dressing emitted a curious fœtid, mousy smell. There was also a small superficial bleb just proximal to the original wound. Hot fomentations were now applied four-hourly.

The following day the temperature remained at 102° F., but by evening the pulse rate had risen to 136, while the arm near the wound and half-way to the elbow was swollen, pitted on pressure and was extremely tender. There was, however, no sign of pus. The arm was put in continuous hot eusol baths, but as there was no improvement it was again opened on the following morning.

Chloroform anæsthesia was administered. It was then found that on deep pressure, a peculiar creaky crepitus could be elicited over the distal portion of the forearm. Only then was the true condition suspected.

On incision, the muscles were of the characteristic greenish colour and on pressure small bubbles of gas exuded from the wounds. The patient's condition precluded amputation, and it was therefore necessary to be content with free incision.

Shortly after coming out of the anæsthetic, the boy became delirious and died two hours later.

Conclusions and Diagnosis.—It would appear that the definite diagnostic points as laid down in the text-books, occur too late for any treatment—except possibly that by anti-serum—to be of any avail, while the early indefinite signs are insufficient to warrant such radical measures as amputation.

Two cases of gas-gangrene have recently been reported in the British Medical Journal, and from these and the above case the following points are suggestive:—

1. The early appearance of "unhealthiness" in the wound.
2. The curious "mousy" smell of the dressings and wound.
3. The early swelling and œdema of the surrounding parts with the appearance of large superficial blebs.

Singly these signs may mean little, but when they occur together a diagnosis of gas-gangrene should be kept in mind.

The other signs, such as the colour of the affected muscles and the presence of gas and crepitus in the wound, all occur too late to be of much use from the point of view of treatment.

Where a well-equipped laboratory is close at hand, swabs and cultures from the wound may show the presence of the causative organism.

Treatment.—At the present moment treatment is limited to amputation as soon as the diagnosis is assured. Herein lies the difficulty. The early phase when amputation is an almost certain cure is marked by indefinite signs. Is one justified in removing an arm or a leg merely on suspicion?

Fortunately, serum treatment when available offers infinitely better results than amputation and at the same time it frees the surgeon from a nerve-racking decision.

TABLE I.

A. EUROPEAN STAFF.

Name.	Rank of Appointment.	Where Stationed on 31st December, 1928.
J. A. Taylor	Director of Medical and Sanitary Services	Zanzibar
B. Spearman	Deputy Director of Sanitary Services	On leave
S. M. Vassallo	Resident Surgical Officer	Zanzibar
J. M. Semple	Medical Officer	,,
W. A. Young	,, ,,	On leave
T. A. Austin	,, ,,	(Pemba) Chake Chake
H. O. Watkins-Pitchford	,, ,,	Zanzibar
W. H. Smith	,, ,,	,,
D. D. McCarthy	,, ,,	(Pemba) Weti
J. A. Jermy	,, ,,	Zanzibar
Miss A. E. Chambers	Matron	,,
,, V. I. Dargan	Nursing Sister	On leave
,, I. Pegg	,, ,,	Zanzibar
,, I. F. Webb	,, ,,	On leave
,, K. Cameron	,, ,,	(Pemba) Chake Chake
,, M. A. McKie	,, ,,	Zanzibar
,, E. Bennett	,, ,,	(Pemba) Weti
,, A. Miles	,, ,,	On water
W. M. Aders	Economic Biologist	Zanzibar
P. Cairns	Sanitary Superintendent	,,
E. H. Lavers	Sanitary Inspector	On leave
J. E. Harmston	Accountant and Storekeeper	Zanzibar

B. PRINCIPAL MEMBERS OF SUBORDINATE STAFF.

Name.	Rank.	Where Stationed on 31st December, 1928.
K. V. Joshi	Assistant Surgeon	Zanzibar
C. D. Rana	Sub-Assistant Surgeon	(Pemba) Weti
M. L. Mehta	,, ,,	Zanzibar
M. V. Vaidya	,, ,,	Mkoani
R. C. Sood	,, ,,	(Pemba) Chake Chake
T. W. Dev	,, ,,	Mkokotoni
Dinanath Koura	,, ,,	Zanzibar
S. Livingstone	Dispenser	,,
A. J. Rawal	,,	,,
J. F. de Cruz	,,	,,
C. Almeida	,,	On leave
L. A. Vaz	,,	Zanzibar
M. da Silva	,,	(Pemba) Chake Chake
S. B. P. Fernandes	,,	On leave
J. J. Antao	,,	Zanzibar
I. B. Martin	Chief Clerk	,,
F. de Souza	Senior Sanitary Inspector	,,
Jadowji K. Gohel	Sanitary Inspector	(Pemba) Chake Chake
A. A. Madhani	,, ,,	Zanzibar
F. X. F. Lobo	Cashier	On leave
A. G. Kark	Senior Laboratory Assistant	Zanzibar

C. APPOINTMENTS, CHANGES, ETC., IN STAFF.

Name.	Rank of Appointment.	Date.
	APPOINTMENTS.	
	(a) Europeans.	
T. A. Jermy	Medical Officer	11-5-28
Miss E. Bennett	Nursing Sister	16-1-28
,, K. Cameron	,,	20-1-28
,, M. A. McKie	,,	20-1-28
,, A. Miles	,,	8-12-28
	(b) Asiatics.	
H. J. Rawal	4th Grade Clerk	9-11-28
	TRANSFERRED TO MEDICAL DEPARTMENT.	
	(a) Europeans.	
J. E. Harmston	Accountant and Storekeeper (from Kenya)	2-2-28
	(b) Asiatics.	
F. X. Almeida	4th Grade Clerk (from Harbour Works)	10-9-28
	ACTING APPOINTMENTS.	
B. Spearman	Deputy Director of Sanitary Services, as Acting Director of Medical and Sanitary Services	18-1-28 to 4-8-28
J. M. Semple	Medical Officer, as Acting Deputy Director of Sanitary Services	18-1-28 ,, 4-8-28 and from 19-11-28 to 31-12-28
W. A. Young	Medical Officer, as Acting Resident Surgical Officer	1-1-28 ,, 18-4-28
	PROMOTION.	
K. V. Joshi	From Sub-Assistant Surgeon to Assistant Surgeon	1-1-28
	DEATH.	
Michael Bunsef	Dispenser	13-9-28
	INVALIDING.	
K. R. Trivedi	4th Grade Clerk	4-10-28
	TRANSFERRED FROM MEDICAL DEPARTMENT.	
	(a) Europeans.	
J. B. C. Madge	Medical Officer (transferred to Tanganyika Territory)	14-4-28
W. L. Gopsill	Medical Officer (transferred to Nyasaland)	1-10-28
	(b) Asiatics.	
D. K. Nagar	4th Grade Clerk (transferred to P. W. D.)	1-7-28
	RETIREMENTS.	
F. P. Paul	Sub-Assistant Surgeon	8-1-28
J. M. Noronha	Cashier	16-1-28
Khamis bin Juma	Mosquito Inspector	18-2-28
Kamil Abdulrehman	,, ,,	6-4-28
D. C. Vaz	Sanitary Inspector	23-6-28
J. P. Fernandes	Mosquito Inspector	12-8-28
	TERMINATION OF APPOINTMENT.	
Miss A. S. Milne	Nursing Sister	4-12-28

LEAVE.

Name.	Rank of Appointment.	Date.
	(a) Europeans.	
J. A. Taylor	Director of Medical and Sanitary Services	4-1-28 to 5-8-28
B. Spearman	Deputy Director of Sanitary Services	19-11-28 ,, 31-12-28
S. M. Vassallo	Resident Surgical Officer	1-1-28 ,, 19-4-28
W. A. Young	Medical Officer	2-5-28 ,, 31-12-28
W. H. Smith	,, ,,	1-1-28 ,, 21-7-28
W. L. Gopsill	,, ,,	7-5-28 ,, 30-9-28
J. B. C. Madge	,, ,,	1-1-28 ,, 13-4-28
Miss A. S. Milne	Nursing Sister	30-5-28 ,, 4-12-28
,, I. Pegg	,, ,,	25-3-28 ,, 27-10-28
,, V. I. Dargan	,, ,,	22-10-28 ,, 31-12-28
,, I. F. Webb	,, ,,	11-12-28 ,, 31-12-28
P. Cairns	Sanitary Superintendent	9-4-28 ,, 27-10-28
E. H. Lavers	Sanitary Inspector	30-7-28 ,, 31-12-28
	(b) Asiatics.	
M. V. Vaidya	Sub-Assistant Surgeon	1-1-28 ,, 17-6-28
S. B. P. Fernandes	Dispenser	3-9-28 ,, 31-12-28
J. J. Antao	,,	30-5-28 ,, 18-11-28
F. X. F. Lobo	Cashier	29-10-28 ,, 31-12-28
A. G. Kark	Senior Laboratory Assistant	1-1-28 ,, 12-2-28
S. de Souza	Clerk	29-10-28 ,, 31-12-28
D. K. Nagar	,,	1-1-28 ,, 17-6-28
K. R. Trivedi	,,	2-5-28 ,, 4-10-28
J. F. Rodrigues	,,	1-1-28 ,, 20-5-28
M. A. Allidina	Sanitary Inspector	19-9-28 ,, 31-12-28
A. G. de Souza	,, ,,	30-3-28 ,, 9-9-28
M. A. Remtulla	,, ,,	1-1-28 ,, 20-5-28

TABLE II.

(A) EXPENDITURE :—

		£
Personal Emoluments :—		
Salaries and Allowances		37,383
Other Charges :—	£	
Books and Periodicals	41	
Staff Clothing and Uniforms	205	
Light and Power	286	
Fuel	168	
Incidental Expenses	59	
Subsistence of Hospital Patients	1,553	
Drugs and Surgical Requisites	2,534	
Fuel for Motor-Boat	60	
Subsistence of Lepers	1,391	
Passages	2,429	
Purchase of Opium	44	
Rewards for killing Rats	1	
Transport Allowances	299	
Travelling Allowances	58	
Transport	319	
Fuel for Motor Vehicles	30	
Repairs to Transport Vehicles	120	
Burial of Destitutes	21	
General Stores	1,691	
	——	11,309

Special Expenditure :—

Instruments and Appiances	97	
2 Typewriters	42	
2 Microscopes	65	
Courses of Instruction to Staff	217	
Furniture	90	
	——	511
Total Expenditure		£49,203

(B) Revenue :—

	£
Hospital fees, sale of drugs, etc	1,044
Contribution from neighbouring dependencies for Quarantine Services	2,637
	£3,681

Table III.

(1) Return of Statistics of Population for the year (the figures are only approximately correct):—

Number of inhabitants in 1927	220,513
Number of births during the year 1928	4,236
Number of deaths during the year 1928	4,302
Number of immigrants during the year 1928	19,422
Number of emigrants during the year 1928	19,981
Number of inhabitants in 1928	219,888
Decrease	625

(2) Births registered in the Island of Zanzibar, 1922-1928:—

	1922.	1923.	1924.	1925.	1926.	1927.	1928.
Town Area ...	481	413	501	424	437	471	526
Northern District ...	1,090	785	1,064	1,073	846	1,102	916
Southern District ...	1,087	837	1,069	849	915	1,033	1,088
Totals ...	2,658	2,035	2,634	2,346	2,198	2,606	2,530

(3) Deaths registered in the Island of Zanzibar, 1922-1928:—

	1922.	1923.	1924.	1925.	1926.	1927.	1928.
Town Area ...	1,262	1,258	1,043	1,379	1,560	1,097	1,093
Northern District ...	888	1,009	749	854	799	658	788
Southern District ...	1,307	1,187	1,040	1,146	1,473	1,170	1,240
Totals ...	3,457	3,454	2,832	3,379	3,832	2,925	3,121

(4) Comparative Statement of Births and Deaths registered in the Island of Zanzibar, 1922-1928:—

	1922.	1923.	1924.	1925.	1926.	1927.	1928.
Town Area—							
Births ...	481	413	501	424	437	471	526
Deaths ...	1,262	1,258	1,043	1,379	1,560	1,097	1,093
District—							
Births ...	2,177	1,622	2,133	1,922	1,761	2,135	2,004
Deaths ...	2,195	2,196	1,789	2,000	2,272	1,828	2,028
Total—							
Births ...	2,658	2,035	2,634	2,346	2,198	2,606	2,530
Deaths ...	3,457	3,454	2,832	3,379	3,832	2,925	3,121

(5) Comparative Statement of Births and Deaths registered in the Island of Pemba 1922-1928:—

District:	1922.	1923.	1924.	1925.	1926.	1927.	1928.
Chake Chake—							
Births ...	625	485	565	860	689	1,047	693
Deaths ...	328	366	476	446	377	422	437
Weti—							
Births ...	467	350	376	419	517	699	628
Deaths ...	491	621	461	441	491	530	454
Mkoani—							
Births ...	575	319	340	749	426	406	385
Deaths ...	397	302	342	307	317	251	290
Total—							
Births ...	1,667	1,154	1,281	2,028	1,632	2,152	1,706
Deaths ...	1,216	1,289	1,279	1,194	1,185	1,203	1,181

(6) Comparative Statement of Births and Deaths registered in the Zanzibar Protectorate 1922-1928:—

	1922.	1923.	1924.	1925.	1926.	1927.	1928.
Zanzibar Island:							
Births ...	2,658	2,035	2,634	2,346	2,198	2,606	2,530
Deaths ...	3,457	3,454	2,832	3,379	3,832	2,925	3,121
Pemba Island:							
Births ...	1,667	1,154	1,281	2,028	1,632	2,152	1,706
Deaths ...	1,216	1,289	1,279	1,194	1,185	1,203	1,181
Total—							
Births ...	4,325	3,189	3,915	4,374	3,830	4,758	4,236
Deaths ...	4,673	4,743	4,111	4,573	5,017	4,128	4,302
Excess of deaths over births ...	348	1,554	196	199	1,187	—	66
Excess of births over deaths	—	—	—	—	—	630	—

(7) Births in Zanzibar Township during the year 1928:—

(*a*) Total number—582.

Births, live		526
Births, still-born		56
	Total	582

(*b*) Sex of live births :

Males	259
Females	267
Total	526

(*c*) Nationality of live births :

Europeans	9
Arabs	38
Asiatics (excluding Arabs)	382
Africans	97
Total	526

(8) Deaths in Zanzibar Township during the year 1928:—

(*a*) Total number—1,093.

(*b*) Sex :

Males	599
Females	494
Total	1,093

(*c*) Nationality :

Europeans	1
Arabs	119
Asiatics (excluding Arabs)	273
Africans	700
Total	1,093

(9) Return of Causes of Deaths in Zanzibar Town during 1928:—

I. *Epidemic, Endemic and Infectious Diseases* :

Diseases.	No.
Enteric Group—	
Typhoid Fever	1
Paratyphoid B.	1
Malaria—	
Tertian	2
Aestivo-autumnal	25
Cachexia	46
Blackwater	3
Whooping Cough	1
Influenza	3
Dysentery—	
Amœbic	5
Bacilary	9
Undefined or due to other causes	13
Acute Poliomyelitis	1
Tetanus	4
Tuberculosis, Pulmonary and Laryngeal	189
Tuberculosis of the Central Nervous System	1
Syphilis	2
Gonorrhœa	1
Septicæmia	5

II.	*General Diseases not mentioned above* :	
	Cancer or other Malignant Tumours	6
	Tumours, non-Malignant	3
	Chronic Rheumatism	1
	Rickets	1
	Diabetes (not including Insipidus)	7
	Anæmia	1
	Diseases of the Spleen	2
	Toxæmia	1
III.	*Affections of Nervous System and Organs of the Senses* :	
	Meningitis	2
	Apoplexy	14
	Paralysis	5
	General Paralysis of the Insane	1
	Other forms of Mental Alienation	2
	Epilepsy	2
	Infantile Convulsions	36
	Cerebral Compression	1
IV.	*Affections of the Circulatory System* :	
	Pericarditis	2
	Acute Myocarditis	1
	Angina Pectoris	1
	Valvular Disease of the Heart	27
	Embolism or Thrombosis (non-cerebral)	2
V.	*Affections of the Respiratory System* :	
	Bronchitis—	
	(*a*) Acute	5
	(*b*) Chronic	61
	Broncho-Pneumonia	43
	Pneumonia	44
	Pleurisy	2
	Asthma	7
VI.	*Diseases of the Digestive System* :	
	Stomatitis	1
	Tonsilitis	1
	Ulcer of the Duodenum	1
	Diarrhœa and Enteritis— Under two years	12
	Diarrhœa and Enteritis— Two years and over	37
	Ankylostomiasis	50
	Appendicitis	2
	Hernia	4
	Cirrhosis of the Liver	2
	Hepatitis	1
	Diseases of the Pancreas	1
	Peritonitis	6
VII.	*Diseases of the Genito-Urinary System (Non-Venereal)* :	
	Acute Nephritis	6
	Chronic Nephritis	28
	Cystitis	1
	Stricture of Urethra	1
	Hydrocele	1
	Cyst of the Ovaries	1

VIII.	*Puerperal State* :	
	Hæmorrhage	2
	Septicæmia	3
	Eclampsia	1
IX.	*Affections of the Skin and Cellular Tissues* :	
	Gangrene	1
	Cellulitis	2
	Elephantiasis	1
X.	*Diseases of Bones and Organs of Locomotion* :	
	Diseases of Bones	1
	Diseases of Joints	1
XI.	*Malformations* :	
	Infantile	1
XII.	*Diseases of Infancy* :	
	Premature Birth	10
	Other affections of Infancy	1
XIII.	*Affections of Old Age* :	
	Senility	265
	Senile Dementia	2
XIV.	*Affections produced by External Causes* :	
	Suicide by Hanging or Strangulation	3
	Burns	5
	Drowning (accidental)	1
	Wounds (by cutting or stabbing instruments)	5
	Wounds (by fall)	1
	Fracture	5
	Other External Injuries	2
XV.	*Ill-Defined Diseases* :	
	Debility	30
	Shock	1
	Hyperpyrexia	1
	Total	1,093

Table IV.

Meteorological Return.

The following is a brief summary of the more important metereological returns available:

	Zanzibar (Town).			Pemba (Banani).		
Temperature of the air	1892-1926.	1927.	1928.	1899-1926.	1927.	1928.
Mean of daily maxima	84.5	84.6	84.1	86.6	86.1	86.0
Mean of daily minima	76.5	76.4	76.8	76.0	77.1	77.2
Mean of daily range	8.0	8.0	7.3	10.6	9.0	8.8
Mean	80.5	80.5	80.45	81.3	81.6	81.6
Rainfall (inches)	59.43	70.53	59.19	81.72	66.17	84.18
Rainy days	100	140	117	162	161	172

(Statistics in greater detail are recorded in the Blue Book.)

Tables V. and VI.

Return of Diseases and Deaths (In-Patients) and of Diseases (Out-Patients) for the year 1928.

Diseases.	In-patients.					Out-patients.		
	Remaining in Hospital at the end of 1927.	Admitted.	Deaths.	Total Cases Treated.	Remaining in Hospital at the end of 1928.	Males.	Females.	Total.
I. Epidemic, Endemic and Infectious Diseases.								
1 Enteric Group—								
(*a*) Typhoid Fever ..	..	..	..	..	..	..	..	..
(*b*) Paratyphoid A ..	..	..	..	..	..	..	..	..
(*c*) Paratyphoid B ..	..	6	3	6	..	5	1	6
(*d*) Type not defined	1	..	..	1	..	..	..	..
2 Typhus ..	..	..	..	..	..	..	..	..
3 Relapsing Fever ..	..	1	..	1	..	2	1	3
4 Undulant Fever ..	..	..	..	..	..	..	..	..
5 Malaria—								
(*a*) Tertian ..	6	138	1	144	..	3,819	1,334	5,153
(*b*) Quartan	..	4	..	4	..	33	6	39
(*c*) Aestivo-autumnal ..	2	106	..	108	3	744	210	954
(*d*) Cachexia	3	34	..	37	..	584	271	855
(*e*) Blackwater	..	10	3	10	2	15	..	15
(*f*) Type not defined ..	..	..	..	..	..	1,066	170	1,236
6 Small-pox	..	2	..	2	..	2	..	2
7 Measles	..	7	..	7	..	6	1	7
8 Scarlet Fever ..	..	..	..	..	..	..	..	..
9 Whooping Cough ..	..	2	..	2	1	154	111	265
10 Diphtheria ..	..	..	..	..	..	..	..	..
11 Influenza	5	17	..	22	2	631	136	767
12 Miliary Fever ..	..	..	..	..	..	..	..	..
13 Mumps	..	..	..	..	..	26	12	38
14 Cholera	..	..	..	..	..	..	..	..
15 Epidemic diarrhœa ..	..	..	..	..	..	..	..	..
16 Dysentery—								
(*a*) Amœbic	..	6	..	6	..	10	1	11
(*b*) Bacillary	..	46	4	46	1	90	23	113
(*c*) Undefined or due to other causes	..	32	..	32	..	74	27	101
17 Plague	..	..	..	..	..	..	..	..
18 Yellow Fever	..	..	..	..	..	..	..	..
19 Spirochætosis ictero-hæmorrhagica	..	..	..	..	..	..	..	..
20 Leprosy	..	4	..	4	..	12	4	16
21 Erysipelas	..	1	..	1	..	..	1	1
22 Acute Poliomyelitis ..	..	..	..	..	..	1	..	1
23 Encephalitis Lethargica ..	..	..	..	..	..	..	..	..
24 Epidemic Cerebro-spinal Fever	..	..	..	..	..	..	..	..
25 Other Epidemic Diseases—								
(*a*) Rubeola (German Measles)	..	..	..	..	..	3	..	3
(*b*) Varicella (Chicken-pox).	..	13	..	13	2	16	5	21
(*c*) Kala-azar	..	..	..	..	..	..	..	..
(*d*) Phlebotomus Fever ..	..	..	..	..	..	..	..	..
(*e*) Dengue	..	2	..	2	..	3	..	3
(*f*) Epidemic Dropsy ..	..	..	..	..	..	..	..	..
(*g*) Yaws	1	31	..	32	1	4,645	2,053	6,698
(*h*) Trypanosomiasis ..	..	..	..	..	..	..	..	..
Carried forward ..	18	462	11	480	12	11,941	4,367	16,308

TABLES V. AND VI.—(*Continued.*)

Diseases.	In-patients.					Out-patients.		
	Remaining in Hospital at the end of 1927.	Admitted	Deaths.	Total Cases Treated.	Remaining in Hospital at the end of 1928.	Males.	Females.	Total.
Brought forward ..	18	462	11	480	12	11,941	4,367	16,308
I. EPIDEMIC, ENDEMIC AND INFECTIOUS DISEASES *(Contd).*								
26 Glanders	..	..	..	..	..	..	..	..
27 Anthrax	..	..	..	..	..	..	..	..
28 Rabies	..	..	..	..	..	..	..	..
29 Tetanus	..	3	3	3	..	4	..	4
30 Mycosis	..	..	..	..	..	..	1	1
31 Tuberculosis, Pulmonary and Laryngeal	6	92	39	98	8	221	44	265
32 Tuberculosis of the Meninges or Central Nervous System	..	..	..	..	..	5	..	5
33 Tuberculosis of the Intestines or Peritoneum ..	..	1	..	1	..	1	..	1
34 Tuberculosis of the Vertebral Column ..	..	..	..	..	..	3	..	3
35 Tuberculosis of Bones and Joints	..	1	..	1	1	4	1	5
36 Tuberculosis of other Organs-								
(*a*) Skin or Subcutaneous Tissue (Lupus) ..	..	1	..	1	1	1	..	1
(*b*) Bones	..	..	..	..	..	..	..	..
(*c*) Lymphatic system ..	..	2	..	2	2	2	..	2
(*d*) Genito-urinary System..	..	1	..	1	1	1	..	1
(*e*) Other organs ..	..	1	..	1	1	1	..	1
37 Tuberculosis disseminated—								
(*a*) Acute	..	..	..	..	..	..	..	..
(*b*) Chronic	..	..	..	..	..	..	..	..
38 Syphilis—								
(*a*) Primary	8	8	..	16	1	318	94	412
(*b*) Secondary		5	..	5	..	172	81	253
(*c*) Tertiary	1	11	1	12	..	65	28	93
(*d*) Hereditary	..	2	..	2	..	13	..	13
(*e*) Period not indicated ..	..	22	1	22	..	118	42	160
39 Soft Chancre	..	11	..	11	..	405	26	431
40 A.—Gonorrhœa and its complications	1	26	..	27	1	2,103	177	2,280
B.—Gonorrhœal Ophthalmia	..	5	..	5	..	87	53	140
C.—Gonorrhœal Arthritis ..	2	4	1	6	4	207	33	240
D.—Granuloma Venereum ..	..	..	..	..	..	..	..	..
41 Septicæmia	..	5	..	5	1	303	49	352
42 Other Infectious Diseases—								
Filariasis	1	46	..	47	1	249	55	304
II. GENERAL DISEASES NOT MENTIONED ABOVE.								
43 Cancer or other malignant Tumours of the Buccal Cavity	..	2	..	2	..	2	1	3
44 Cancer or other malignant Tumours of the Stomach or Liver	..	6	3	6	..	7	2	9
45 Cancer or other malignant Tumours of the Peritoneum, Intestines and Rectum	..	..	..	..	..	..	..	..
Carried forward ..	37	717	59	754	34	16,233	5,054	21,287

TABLES V. AND VI.—(*Continued.*)

Diseases.	In-patients.					Out-patients.		
	Remaining in Hospital at the end of 1927.	Admitted.	Deaths.	Total Cases Treated.	Remaining in Hospital at the end of 1928.	Males.	Females.	Total.
Brought forward ..	37	717	59	754	34	16,233	5,054	21,287
II. GENERAL DISEASES NOT MENTIONED ABOVE. *(Continued).*								
46 Cancer or other malignant Tumours of the Female Genital Organs ..	..	1	..	1	..	..	1	1
47 Cancer or other malignant Tumours of the Breast ..	..	1	..	1	1	..	1	1
48 Cancer or other malignant Tumours of the Skin ..	..	2	..	2	..	2	..	2
49 Cancer or other malignant Tumours of organs not specified	..	3	1	3	1	2	1	3
50 Tumours non-Malignant ..	..	34	3	34	..	98	23	121
51 Acute Rheumatism ..	..	5	..	5	..	11	2	13
52 Chronic Rheumatism ..	2	12	1	14	2	1,548	844	2,392
53 Scurvy (including Barlow's Disease)	..	1	..	1	..	..	1	1
54 Pellagra	..	..	..	..	..	..	..	..
55 Beri-Beri ..	1	12	..	13	..	27	2	29
56 Rickets ..	..	6	..	6	..	6	..	6
57 Diabetes (not including Insipidus)	..	4	2	4	..	17	6	23
58 Anæmia—								
(*a*) Pernicious ..	..	..	..	..	..	..	..	..
(*b*) Other Anæmias and Chlorosis ..	..	2	..	2	..	282	127	409
59 Diseases of the Pituitary Body	..	..	..	..	..	..	..	..
60 Diseases of the Thyroid Gland—								
(*a*) Exophthalmic Goitre ..	..	..	..	..	..	3	2	5
(*b*) Other Diseases of the Thyroid Gland, Myxoedema	..	4	..	4	..	16	11	27
61 Diseases of the Para-Thyroid Glands	..	..	..	..	..	..	..	..
62 Diseases of the Thymus ..	..	..	..	..	..	..	..	..
63 Diseases of the Supra Renal Glands ..	..	..	..	..	..	..	..	..
64 Diseases of the Spleen ..	..	2	..	2	..	296	135	431
65 Leukæmia—								
(*a*) Leukæmia	..	..	..	..	..	1	..	1
(*b*) Hodgkin's Disease ..	..	..	..	..	..	..	..	..
66 Alcholism	..	3	1	3	..	4	..	4
67 Chronic poisoning by mineral Substances (lead, mercury, etc.)	..	..	..	..	..	..	..	..
68 Chronic poisoning by organic substances (Morphia, Cocaine etc.) ..	..	..	..	..	..	..	..	..
69 Other General Diseases—								
Toxæmia	..	2	1	2	..	3	..	3
III. AFFECTIONS OF THE NERVOUS SYSTEM AND ORGANS OF THE SENSES.								
70 Encephalitis (not including Encephalitis Lethargica)..	..	..	..	..	..	..	..	..
Carried forward ..	40	811	68	851	38	18,519	6,210	24,759

TABLES V. AND VI.—(*Continued.*)

Diseases.	In-patients.					Out-patients.		
	Remaining in Hospital at the end of 1927.	Admitted.	Deaths.	Total Cases Treated.	Remaining in Hospital at the end of 1928.	Males.	Females.	Total.
Brought forward ..	40	811	68	851	38	18,549	6,210	24,759
III. AFFECTION OF THE NERVOUS SYSTEM AND ORGANS OF THE SENSES—(*Continued*).								
71 Meningitis (not including Tuberculous Meningitis or Cerebro-Spinal Meningitis)	..	3	..	3	..	3	..	3
72 Locomotor Ataxia ..	..	2	..	2	..	5	3	8
73 Other Diseases of the Spinal Cord	..	3	..	3	3	3	..	3
74 Apoplexy—								
(*a*) Hæmorrhage ..	..	5	4	5	..	21	2	23
(*b*) Embolism ..	..	..	..	..	..	..	..	..
(*c*) Thrombosis ..	..	..	..	..	..	..	..	..
75 Paralysis—								
(*a*) Hemiplegia ..	1	2	..	3	3	7	3	10
(*b*) Other Paralysis ..	2	6	5	8	2	37	13	50
76 General Paralysis of the Insane	..	1	..	1	..	2	..	2
77 Other forms of Mental Alienation	11	8	1	19	..	11	4	15
78 Epilepsy	..	2	..	2	2	12	1	13
79 Eclampsia, Convulsions (non-puerperal) 5 years or over.	..	..	..	..	..	..	..	..
80 Infantile Convulsions ..	..	..	..	..	..	2	1	3
81 Chorea	..	..	..	..	..	..	..	..
82 A.—Hysteria	..	5	..	5	..	3	5	8
B.—Neuritis	2	8	2	10	..	95	30	125
C.—Neurasthenia ..	..	..	..	..	..	11	6	17
83 Cerebral Softening ..	..	..	..	..	..	..	..	..
84 Other affections of the Nervous System ..	2	11	1	13	..	2,078	566	2,644
85 Affections of the Organs of Vision—								
Conjunctivitis ..	1	14	..	15	..	1,767	544	2,311
Tumours of the Eye ..	1	..	..	1	..	3	..	3
Other affections of the Eye.	4	46	..	50	4	624	184	808
86 Affections of the Ear or Mastoid Sinus ..	..	8	..	8	..	1,278	414	1,692
IV. AFFECTIONS OF THE CIRCULATOY SYSTEM.								
87 Pericarditis	..	2	1	2	..	6	..	6
88 Acute Endocarditis or Myocarditis	..	3	2	3	..	4	1	5
89 Angina Pectoris ..	..	..	..	..	..	..	..	..
90 Other Diseases of the Heart								
(*a*) Valvular—								
Mitral	..	6	5	6	..	35	11	46
Aortic	..	2	1	2	1	2	..	2
Tricuspid	..	1	..	1	1	1	..	1
Pulmonary	..	..	..	..	..	..	..	..
(*b*) Myocarditis.. ..	2	3	1	5	..	14	1	15
(*c*) Other Diseases ..	..	..	..	..	..	10	2	12
Carried forward ..	66	952	91	1,018	54	24,583	8,001	32,584

TABLES V. AND VI.—(*Continued.*)

Diseases.	In-patients.					Out-patients.		
	Remaining in Hospital at the end of 1927.	Admitted.	Deaths.	Total Cases Treated.	Remaining in Hospital at the end of 1928.	Males.	Females.	Total.
Brought forward ..	66	952	91	1,018	54	21,583	8,001	32,584
IV. AFFECTION OF THE CIRCULATORY SYSTEM—*(Continued).*								
91 Diseases of the Arteries—								
Arterio-Sclerosis ..	..	..	..	..	..	2	..	2
92 Embolism or Thrombosis (non-cerebral) ..	..	1	1	1	..	3	..	3
93 Diseases of the Veins—								
Hæmorrhoids ..	2	29	..	31	..	74	46	120
Varicose Veins ..	..	3	..	3	1	36	9	45
Phlebitis	..	..	..	..	..	8	2	10
94 Diseases of the Lymphatic System—								
Lymphangitis	..	9	..	9	..	140	45	185
Lymphadenitis, Bubo (non-specific)	3	54	..	57	4	392	33	425
95 Hæmorrhage of undetermined cause	..	..	..	..	..	17	2	19
96 Other affections of the Circulatory System ..	..	..	..	..	..	3	1	4
V. AFFECTIONS OF THE RESPIRATORY SYSTEM.								
97 Diseases of the Nasal Passages—								
Adenoids	..	..	..	..	..	3	..	3
Polypus	..	4	..	4	..	8	2	10
Rhinitis	..	1	..	1	..	64	22	86
Coryza	..	..	..	..	..	949	227	1,176
Other Diseases ..	..	7	..	7	..	7	..	7
98 Affections of the Larynx—								
Laryngitis	..	2	..	2	..	101	16	117
99 Bronchitis—								
(*a*) Acute	1	49	..	50	2	5,866	1,807	7,673
(*b*) Chronic	2	14	..	16	..	871	241	1,112
100 Broncho-Pneumonia ..	2	10	3	12	..	8	2	10
101 Pneumonia—								
(*a*) Lobar	..	57	15	57	..	79	21	100
(*b*) Unclassified ..	6	6	1	12	..	37	13	50
102 Pleurisy, Empyema ..	2	12	..	14	..	68	12	80
103 Congestion of the Lungs ..	..	..	..	..	..	..	..	..
104 Gangrene of the Lungs ..	..	..	..	..	..	..	..	..
105 Asthma	..	18	2	18	1	359	129	488
106 Pulmonary Emphysema ..	..	..	..	..	..	1	..	1
107 Other affections of the Lungs	..	2	..	2	..	15	1	16
VI. DISEASES OF THE DIGESTIVE SYSTEM.								
108 A.—Diseases of Teeth or Gums—								
Caries, Pyorrhœa, etc. ..	..	11	..	11	..	3,448	1,049	4,497
B.—Other affections of the Mouth	..	5	..	5	..	176	67	243
Carried forward ..	84	1,246	113	1,330	62	37,318	11,748	49,066

TABLES V. AND VI.—(*Continued.*)

Diseases.	In-patients.					Out-patients.		
	Remaining in Hospital at the end of 1927.	Admitted.	Deaths.	Total Cases Treated.	Remaining in Hospital at the end of 1928.	Males.	Females.	Total.
Brought forward ..	84	1,246	113	1,330	62	37,318	11,748	49,066
VI. DISEASES OF THE DIGESTIVE SYSTEM—*(Continued).*								
109 Affections of the Pharynx or Tonsils—								
Tonsillitis	..	15	1	15	..	604	212	816
Pharyngitis	..	5	..	5	..	339	41	380
110 Affections of the Oesophagus	..	..	..	..	..	..		..
111 A.—Ulcer of the Stomach ..	..	..	..	..	..	1	1	2
B.—Ulcer of the Duodenum	..	3	2	3	..	3	3	6
112 Other affections of the Stomach—								
Gastritis	..	4	..	4	..	152	115	267
Dyspepsia, etc. ..	4	11	..	15	..	972	345	1,317
113 Diarrhœa and Enteritis—								
Under two years ..	1	28	1	29	..	451	114	565
114 Diarrhœa and Enteritis—								
Two years and over ..	1	28	3	29	2	2,486	941	3,427
Colitis	..	..	..	..	..	12	3	15
Ulceration	..	1	..	1	..	4	1	5
114a Sprue	..	..	..	..	..	..	..	..
115 Ankylostomiasis ..	16	250	23	266	17	11,540	5,404	16,944
116 Diseases due to Intestinal Parasites—								
Cestoda (Tænia) ..	..	3	..	3	..	51	37	88
Nematoda (other than Ankylostoma)—								
Ascaris	..	1	..	1	..	145	33	178
Other parasites ..	..	..	..	..	..	7	5	12
117 Appendicitis	..	6	1	6	..	15	4	19
118 Hernia	11	142	5	153	8	388	8	396
119 A.—Affections of the Anus, Fistula, etc ..	..	14	..	14	..	14	2	16
119 B.—Other affections of the Intestines	..	9	..	9	1	9,106	3,790	12,896
120 Acute Yellow Atropy of the Liver	..	..	..	..	..	..	..	..
121 Hydatid of the Liver ..	..	..	..	..	..	..	..	..
122 Cirrhosis of the Liver—								
(*a*) Alcoholic	..	..	..	..	..	..	..	..
(*b*) Other forms ..	1	2	..	3	1	4	2	6
123 Biliary Calculus ..	..	..	..	..	..	..	..	..
124 Other affections of the Liver—								
Abscess	..	1	..	1	..	2	1	3
Hepatitis	2	10	..	12	..	119	14	133
Cholecystitis	..	..	..	..	..	5	1	6
Jaundice	..	6	..	6	1	25	5	30
125 Diseases of the Pancreas ..	..	..	..	..	..	..	..	..
126 Peritonitis (of unknown cause)	..	13	6	13	..	15	1	16
127 Other affections of the Digestive System ..	..	1	..	1	..	9	1	10
Carried forward ..	120	1,799	155	1,919	92	63,787	22,832	86,619

TABLES V. AND VI.—(*Continued.*)

Diseases.	In-patients.					Out-patients.		
	Remaining in Hospital at the end of 1927.	Admitted.	Deaths.	Total Cases Treated.	Remaining in Hospital at the end of 1928.	Males.	Females.	Total.
Brought forward ..	120	1,799	155	1,919	92	63,787	22,832	86,619
VII. DISEASES OF THE GENITO-URINARY SYSTEM (NON-VENEREAL).								
128 Acute Nephritis ..	..	7	2	7	..	15	3	18
129 Chronic Nephritis ..	1	6	4	7	..	50	48	98
130 A.—Chyluria	..	..	..	..	..	1	1	2
130 B.—Schistosomiasis ..	..	19	..	19	..	746	77	823
131 Other affections of the Kidneys—								
Pyelitis, etc.	..	3	..	3	..	47	5	52
132 Urinary Calculus ..	..	..	..	..	..	1	1	2
133 Diseases of the Bladder—								
Cystitis, etc.	1	25	1	26	1	145	40	185
134 Diseases of the Urethra—								
(*a*) Stricture	..	9	..	9	..	81	..	84
(*b*) Other Diseases ..	1	18	1	19	1	65	15	80
135 Diseases of the Prostate—								
Hypertrophy	..	1	..	1	..	1	..	1
Prostatitis	..	..	..	..	..	23	..	23
136 Diseases (non-Venereal) of the Genital Organs of Man—								
Epididymitis	..	8	..	8	1	22	..	22
Orchitis	2	43	..	45	2	521	..	521
Hydrocele	9	203	4	212	16	548	..	548
Ulcer of Penis	1	110	..	111	2	959	..	959
137 Cysts or other non-malignant Tumours of the Ovaries ..	..	3	1	3	..	..	5	5
138 Salpingitis	..	7	..	7	..	..	25	25
139 Uterine Tumours (non-malignant)	..	14	..	14	..	..	44	44
140 Uterine Hæmorrhage (non-puerperal)	..	..	..	..	..	..	7	7
141 A.—Metritis	..	2	..	2	..	..	7	7
B.—Other affections of the Female Genital Organs—								
Displacement of Uterus ..	..	1	..	1	..	..	47	47
Amenorrhœa	..	..	..	..	..	..	174	174
Dysmenorrhœa ..	..	..	..	..	..	..	29	29
Leucorrhœa	..	..	..	..	..	..	23	23
Other affections ..	..	..	..	..	..	..	285	285
142 Diseases of the Breast (non-puerperal)—								
Mastitis	..	1	..	1	1	..	63	63
Abscess of Breast ..	..	..	..	..	..	..	18	18
VIII. PUERPERAL STATE.								
143 A.—Normal Labour ..	1	30	..	31	1	..	43	43
B.—Accidents of Pregnancy-								
(*a*) Abortion	..	2	..	2	..	..	10	10
(*b*) Ectopic Gestation ..	..	1	..	1	..	..	2	2
(*c*) Other accidents of Pregnancy	..	..	..	..	..	..	11	11
Carried forward ..	136	2,312	168	2,448	117	67,015	23,815	90,830

TABLES V. AND VI.—(*Continued.*)

Diseases.	In-patients.					Out-patients.		
	Remaining in Hospital at the end of 1927.	Admitted.	Deaths.	Total Cases Treated.	Remaining in Hospital at the end of 1928.	Males.	Females.	Total.
Brought forward ..	136	2,312	168	2,448	117	67,015	23,815	90,830
VIII. PUERPERAL STATE--(*Cont*).								
144 Puerperal Hæmorrhage ..	..	2	..	2	1	..	5	5
145 Other aceidents of Parturition	..	2	..	2	..	..	2	2
146 Puerperal Septieæmia ..	..	..	..	..	..	..	2	2
147 Phlegmasia Dolens ..	..	..	..	..	..	..	..	..
148 Puerperal Eelampsia ..	..	..	..	..	..	..	2	2
149 Sequelæ of Labour ..	..	2	..	2	..	..	2	2
150 Puerperal affections of the Breast	..	..	..	..	..	..	..	..
IX. AFFECTIONS OF THE SKIN AND CELLULAR TISSUES.								
151 Gangrene	..	5	1	5	1	10	3	13
152 Boil	..	3	..	3	..	909	193	1,102
Carbuncle	..	11	..	11	..	14	..	14
153 Abscess	5	83	1	88	3	666	238	904
Whitlow	..	18	..	18	..	289	82	371
Cellulitis	2	52	1	54	2	714	96	810
154 A.—Tinea	..	3	..	3	..	749	271	1,020
B.—Scabies	1	11	..	12	..	5,494	1,993	7,487
C.—Tropieal Ulcer ..	2	18	..	20	..	2,321	624	2,945
D.—Other Ulcers ..	16	282	..	298	14	10,259	1,804	12,063
155 Other Diseases of the Skin —								
Erythema	..	1	..	1	..	8	1	9
Urticaria ..	..	2	..	2	..	20	5	25
Eezema	1	5	..	6	..	487	159	646
Herpes	..	2	..	2	..	18	6	24
Psoriasis	..	1	..	1	..	15	4	19
Elephantiasis	10	35	2	45	3	182	65	247
Myiasis	..	..	..	..	..	2	1	3
Chigoes	2	6	..	8	..	708	156	864
Other Diseases ..	1	10	..	11	..	791	180	971
X. DISEASES OF BONES AND ORGANS OF LOCOMOTION (OTHER THAN TUBERCULOUS).								
156 Diseases of Bones ..	4	8	1	12	7	44	5	49
157 Diseases of Joints—								
Arthritis	..	24	1	24	4	209	37	246
Synovitis	..	8	..	8	2	177	47	224
158 Other Diseases of Bones or Organs of Loeomotion ..	..	29	2	29	2	960	318	1,278
XI. MALFORMATIONS.								
159 Malformations ..	..	2	1	2	.	2	..	2
XII. DISEASES OF INFANCY								
160 Congenital Debility ..	..	3	1	3	..	25	7	32
161 Premature Birth ..	..	..	..	..	..	..	..	..
162 Other affeetions of Infancy..	..	..	..	..	..	4	4	8
Carried forward ..	180	2,940	179	3,120	156	92,092	30,127	122,219

TABLES V. AND VI.—(*Continued.*)

Diseases.	In-patients.					Out-patients.		
	Remaining in Hospital at the end of 1927.	Admitted.	Deaths.	Total Cases Treated.	Remaining in Hospital at the end of 1928.	Males.	Females.	Total.
Brought forward ..	180	2,940	179	3,120	156	92,092	30,127	122,219
XII. DISEASES OF INFANCY *(Continued)*.								
163 Infant Neglect (infants of three months or over) ..	..	..	..	..	..	1	1	2
XIII. AFFECTIONS OF OLD AGE.								
164 Senility	19	24	3	43	28	100	46	146
Senile Dementia ..	..	4	1	4	..	32	10	42
XIV. AFFECTIONS PRODUCED BY EXTERNAL CAUSES.								
175 Food Poisoning ..	..	1	..	1	..	2	2	4
176 Attacks of Poisonous Animals								
Snake Bite	..	1	..	1	..	9	..	9
Insect Bite	..	..	..	..	..	9	2	11
177 Other accidental Poisonings	..	5	..	5	..	9	..	9
178 Burns (by Fire) ..	3	8	..	11	1	244	115	359
179 Burns (other than by Fire)..	..	15	3	15	..	19	8	27
182 Drowning (accidental) ..	..	..	..	..	..	1	..	1
183 Wounds (by Firearms, war excepted)	..	5	..	5	..	6	..	6
184 Wounds (by cutting or stabbing Instruments) ..	2	124	5	126	1	3,432	455	3,887
185 Wounds (by Fall) ..	10	100	..	110	5	2,927	242	3,169
186 Wounds (in Quarries or Mines)	..	..	..	..	..	66	11	77
187 Wounds (by Machinery) ..	..	2	..	2	..	248	35	283
188 Wounds (crushing, e.g., railway accidents, etc.) ..	..	5	..	5	..	5	1	6
189 Injuries inflicted by Animals, (bites, kicks, etc.) ..	..	..	..	..	..	47	13	60
192 A.—Over fatigue ..	..	..	..	..	..	1	..	1
B.—Hunger or Thirst ..	..	..	..	..	..	..	..	..
194 Exposure to Heat—								
Heatstroke	..	..	..	..	.	6	2	8
201 A.—Dislocation ..	..	5	..	5	1	75	22	97
B.—Sprain	1	13	..	14	..	332	35	367
C.—Fracture	..	45	5	45	..	77	5	82
202 Other external Injuries ..	2	100	..	102	1	703	73	776
203 Deaths by Violence of unknown cause ..	..	..	..	..	..	..	..	..
XV. ILL-DEFINED DISEASES.								
204 Sudden Death (cause unknown)	..	..	..	..	..	..	..	..
205 A.—Diseases not already specified or ill-defined—	..	..	..	..	..	..	..	..
Ascites	..	1	..	1	..	16	16	32
Œdema	2	5	..	7	..	126	38	164
Asthenia	7	135	74	142	43	708	252	960
Shock	..	..	..	..	..	..	1	1
Hyperpyrexia ..	..	..	..	..	..	1	..	1
Pyrexia of uncertain origin	..	16	1	16	1	763	173	936
N. Y. D. ..	..	4	..	4	..	66	14	80
B.—Malingering ..	..	1	..	1	..	14	..	14
Total ..	226	3,559	271	3,785	237	102137	31,699	133,836

APPENDIX I.

Registration of Medical Practitioners, Dentists and Druggists.

The Registration Board consists of the Director of Medical and Sanitary Services, the Deputy Director of Sanitary Services and one registered medical practitioner not in Government service.

The Board met on one occasion during the year, and one medical practitioner in Government service and one druggist not in Government service were registered.

The number on the Register at the end of the year were: Medical practitioners 24, dentists 5 and druggists 23. Of these, 12 medical practitioners, 2 dentists and 7 druggists were in Government service.

APPENDIX II.

Funzi Leper Settlement.

Miss Bartlett and Miss Dunford, of the Universities' Mission to Central Africa, continued to reside on Funzi Island throughout the year and not only carried out specific and general treatment and nursed the bed-ridden, but also, by encouraging and providing employment and different forms of recreation and amusement, promoted the comfort, contentment and well-being of the lepers in every possible way. During the year all the lepers remaining in other settlements were transferred to Funzi Island. In the Medical Report for 1924 it was stated that the lepers living in the smaller settlements were more cheerful and contented than those living on Funzi. Since then, however, the conditions on Funzi have so greatly improved that the transfer there last year was effected not only without any form of compulsion but at the request of the lepers themselves. This was due to the favourable reports which had reached them with regard to the conditions prevailing on Funzi, and speaks volumes for the admirable manner in which Miss Bartlett and Miss Dunford have continued and extended the self-sacrificing work initiated by Miss Philpot in 1924.

The following table summarises the Funzi Island Settlement returns for the year under review: —

	Males.	Females.	Total.
Lepers remaining from 1927	79	50	129
Number of new cases admitted during 1928	12	4	16
Number transferred from other settlements	13	18	31
Number discharged during 1928	13	4	17
Number died during 1928	9	5	14
Number remaining end of 1928	82	63	145

Report of Miss Bartlett, Sister-in-Charge.

During the past year the lepers have been treated with intravenous and subcutaneous injections of either Alepol or Hydnocreol. Alepol has been given both intravenously and subcutaneously, and I find that it has had the best effect on the whole, except in the cases of rather wasted or far advanced cases which have done better on injections of Hydnocreol.

One boy of sixteen who has been treated with Alepol has done particularly well. On admission, about 18 months ago, he was covered all over on the face and ears with nodules, of which now there is scarcely a trace, and I hope he will make a complete recovery. He was first treated for hookworm, and on that clearing up he began at once to respond to treatment for leprosy.

The Hydnocarpus nuts have been given daily to a large number of the lepers. I do not find that they are very efficacious without injections as well, judging by the few cases who have taken nuts only, but undoubtedly they have a very beneficial effect, taken in

conjunction with the injections, by acting as a mild purgative and so assisting greatly in combating one of the troubles lepers suffer from so greatly. There have been no cases of dysentery this year—a marked contrast to last year, when ten deaths occurred due to this disease. Malaria and hookworm are the chief complications—each new patient is almost certain to suffer from the latter, and a number of the older established lepers here have venereal disease. A considerable number have also filarial disease.

I attribute the better general health of the community largely to the fact that many more lepers now work on their gardens, grow more green food and get more exercise.

During the year all the remaining lepers of Pujini and Kengeja Colonies were transferred to Funzi.

The deaths in the settlement occurred chiefly among the older patients, with the exception of two boys aged 16 and 14 years respectively. One of these was mentally defective and had a very large malarial spleen; the other died suddenly after having suffered from heart trouble for several months.

Extract from report of Dr. McCarthy, visiting Medical Officer.

Of the lepers remaining at the end of the year, 64 males and 54 females were receiving specific treatment, and of these 31 males and 24 females were showing improvement.

For the most part, treatment is first directed towards other diseases which may be—and usuallly are—present. When these have disappeared, specific treatment is instituted, as it has been found futile to expect improvement in leprotic conditions when other disease is present.

Those who refuse injections are started on Hydnocarpus nuts, commencing with four per day and working up over a period of a few weeks to 14-16 per day, which appears to be the maximum point of toleration. These nuts, which may or may not have a great specific action, certainly improve general condition by overcoming the extreme degree of constipation from which most of lepers suffer.

Of specific treatments, Hydnocreol is given by subcutaneous infiltration in doses of from 3-10 ccs, at weekly intervals, while Alepol is usually given intravenously in 3 per cent solution, the dose varying from 1-5 ccs., commencing with 1 cc and increasing by 0.5 cc weekly until 5 ccs are being given regularly.

APPENDIX III.

Control of Opium.

The difficulty in obtaining permits to buy and use opium is an undoubted stimulus to smuggling and illegal traffic in this drug. Particulars of measures taken against the latter will be found in the reports of the Customs and Police Departments.

The question of the use of poppy capsules has been dealt with in a special report furnished a few years ago.

The following are the particulars regarding licensed opium addicts:—

	1926.		1927.		1928.	
	M.	F.	M.	F.	M.	F.
Number of opium addicts remaining from the previous year ...	89	35	77	32	67	28
Number of applications for permits during the year ...	—	—	4	1	2	1
Number of applications for permits granted during the year ...	—	—	4	1	2	1
Number of applications for permits refused during the year ...	—	—	—	—	—	—
Number of applications for permits cancelled:						
(*a*) owing to death ...	5	2	4	2	3	1
(*b*) owing to other causes ...	7	1	10	3	—	—
Number of opium addicts remaining at the end of the year ...	77	32	67	28	66	28
Amount of opium issued to addicts during the year	ozs. 388.4		ozs. 346.9		ozs. 339.5	
Amount received in payment for opium issued	Rs. 2,408-12		Rs. 2,148-83		Rs. 2,121-87	
Number of prosecutions for illegal possession during the year	31		48		66	
Number of convictions during the year	31		41		64	

APPENDIX IV.

Tenth Annual Report of the Zanzibar Maternity Association for the Year ending 31st December, 1928.

The past year, during which the Association completed the tenth year of its activities, has been one of most remarkable progress. The cases attended by the Association midwives numbered 320, or 54 more than previously recorded in any year and 70 more than in 1927. Of even greater significance, however, is the number of African cases attended, which exceeds that of any previous year by no less than 43. It is also most satisfactory to note that the cases admitted to the Maternity Home numbered 63, or double the number admitted in 1927.

During the year, the Association lost the valuable services of Mrs. Newman who, since her appointment in 1919, had earned the respect and confidence of all communities. Fortunately, it was found possible to replace her by Mrs. Hamletta K. Bhatt who, with Mrs. Aranki, well maintained the high reputation of the service.

The two Arab pupils, mentioned in last year's report as under training, completed their full course of instruction and, having passed the prescribed examination, were appointed Association midwives in July. The manner in which they have since performed their duties has been favourably commented upon, and Miss Locket, the Matron of the Maternity Home, deserves great credit for their thorough and careful training undertaken in addition to her other exacting duties. To Miss Locket must also be given credit for the gradual breaking down of a deep-rooted native prejudice as evidenced by the increasing number of admissions to the Maternity Home.

At the Maternity Home dispensary, 6,683 women attended for treatment of all kinds of ailments. The re-attendances numbered 18,269, making a total attendance of 24,952, and of these attendances for gynæcological treatment numbered 863.

The Tables attached show the activities of the Association in greater detail. A statement of the financial position is also appended, and the thanks of the Association are due to the Government for its annual contribution, to an anonymous contributor and Mr. A. H. Virji for donations of Rs. 100 and Rs. 50 respectively, and to the "Zanzibarbarians" through Mr. C. R. Jacobs, the organiser, for Rs. 603, the proceeds of one of their performances.

One of the chief hopes of the Association since its inception has been to gain the confidence of the natives and so be in a position to render them some assistance. This hope has now to some small extent been fulfilled, and every endeavour must be made to take advantage of the position gained to make further progress. It must

be realized, however, that at present none of the native cases can afford to pay any fees, and the Association is compelled to rely on the generosity of the public to ensure that its endeavours are not frustrated through lack of funds.

The Executive Committee desires to place on record its appreciation of the valuable services rendered by Mr. A. A. Albuquerque, the Honorary Treasurer, who has not only controlled the finances of the Association, but has at all times been ready to undertake any duties connected with its interests.

B. C. JOHNSTONE,

Honorary Secretary.

TABLE I.

Cases attended by the Association Midwives during 1928, showing the number of each nationality attended as compared with the total number of births among each nationality registered in Zanzibar Town.

Nationality.	Births.	Abortions.	Total.	Births registered.
Swahilis	75	4	79	97
Comorians	12	—	12	
Seychellians	1	—	1	
Other Africans	3	—	3	
Arabs	13	—	13	29
Shihiris	2	—	2	9
Bohoras	45	7	52	51
Hindoos	32	—	32	73
Ithnasharis	83	2	85	83
Other Asiatic Mahomedans	23	1	24	45
Goans	15	—	15	28
Parsees	1	—	1	1
Persians	1	—	1	2
Total	306	14	320	418

Table II.

Comparative Statistics of cases attended by the Association Midwives from 1919 to 1928.

	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928
Swahilis	—	—	11	11	12	18	18	38	44	79
Comorians	—	2	6	6	4	6	7	12	8	12
Other Africans	—	—	—	—	—	—	—	—	—	4
Arabs	—	—	20	13	21	31	27	18	17	13
Shihiris	—	—	—	1	4	2	3	2	1	2
Total	—	2	37	31	41	57	55	70	70	110
Foreign Communities	46	59	55	147	96	184	197	196	180	210
Grand Total	46	61	92	178	137*	241*	252	266	250	320

*Note.—Total cases including abortions in 1923 and 1924 were 151 and 256 respectively.

Table III.

MWEMBELADU MATERNITY HOME.

Cases admitted to the Home during 1928.

Nationality.	Confinements.	Abortions.	Gynæcological	Total.
Swahilis	59	4	1	64
Arabs	1	—	—	1
Shihiris	2	—	—	2
Comorians	2	—	—	2
Totals	64	4	1	69

Table IV.

THE ZANZIBAR MATERNITY ASSOCIATION.

Statement of Receipts and Payments for the year 1928.

	Rs.	as.	p.	Rs.	as.	p
By Balance				6,559	8	9
Receipts—						
Subscriptions	4,250	0	0			
Fees	2,832	0	0			
Donations	753	0	0			
Miscellaneous Receipts	263	15	0			
Government Grant	7,500	0	0			
				15,598	15	0
			Rs.	22,158	7	9

	Rs.	as.	p.	Rs.	as.	p.
Payments—						
Salaries				13,219	6	9
Rent				1,235	0	0
Passages				856	0	0
Servants				42	0	0
Contingencies				167	5	0
Maternity Home						
Servants				420	0	0
Contingencies				116	0	0
				16,055	11	9
Balance—						
Cash at Bank	2,227	12	0			
Less unpaid cheque	125	0	0			
	2,102	12	0			
Cash on fixed deposit N.B.I.	4,000	0	0			
				6,102	12	0
			Rs.	22,158	7	9

A. A. ALBUQUERQUE,
Honorary Treasurer.

ANNUAL VETERINARY REPORT.

For the Year 1928.

SECTION I.—ADMINISTRATION.

A. Staff.

The Veterinary Staff for the year consisted of:—

Veterinary Officer	1
Assistant Veterinary Officer	1
Veterinary Cadets	3
Attendants	12

The posting of the Senior Veterinary Cadet to Pemba in December inaugurated a new era of veterinary activities in that island, where there is a large and valuable cattle population.

Previously any veterinary work in Pemba has been undertaken by the medical staff which, however, has had little time to devote to matters outside ordinary medical duties.

B.—Financial.

The expenditure for the year totalled Rs. 16,086-00.

The revenue from Veterinary Services totalled Rs. 18,103-99. The revenue is derived from the following sources:—

		Rs.	Cts.
Cattle importation and exportation fees	...	4,717	00
Veterinary Hospital fees	...	133	25
Abattoir fees	...	6,415	75
Landing of cattle	...	1,589	07
Wharfage charges for landing cattle	...	407	25
Rent for Mji Mpia Dairy-Sheds	...	4,087	00
Rent for dairy-shed sites at Mji Mpia	...	64	67
Goat Lairage at Gulioni	...	610	00
Cremation fees	...	80	00
		18,103	99

Expenditure on new buildings, repairs, etc., during the year 1928:—

		Rs.	Cts.
Mji Mpia Dairies	...	637	89
Pigaduri	...	936	12
Slaughter House	...	126	51
		1,700	52

SECTION II.—DISEASES OF ANIMALS.

A. Diseases of Ruminants.

Cattle.

Rinderpest.—An outbreak of this disease occurred in a herd of 85 cattle imported from Lamu on 20th May. Thirty beasts fell sick on the 23rd showing typical symptoms of the disease. Post-mortem examination of dead beasts confirmed the diagnosis, and prompt measures were instituted to keep the disease confined to the quarantine area. All animals from this batch were slaughtered in quarantine, and as a precautionary measure further importation of cattle from Lamu was prohibited.

East Coast Fever.—Among cattle housed at Mji Mpia, two calves succumbed to East Coast Fever. The owners of these had evaded dipping.

Regular dippings have been carried out, and it is thought that most of the infected ticks on the pasturages used by these cattle have been destroyed.

Trypanosomiasis.—Of local stock, forty cattle were examined and one cow showed T. congolense.

Of imported stock, 44 oxen and one cow, out of 335 oxen, 18 cows and four calves from Lamu, showed parasites.

The majority were T. congolense.

It is of interest that so many of the male stock were infected. This may be due to the fact that these had been grazed on pasturages or near bush infected with tse-tse, while the cows and calves, being stall-fed, had not been exposed to infection.

As in former years, all animals showing trypanosomes in their blood were killed in quarantine on diagnosis. Such animals are always a menace to the Protectorate, as they may introduce a virulent strain of T. congolense, which has recently undergone cyclical development in a tse-tse. Often T. congolense infections are very scanty, and the discovery of trypanosomes in a single blood film is difficult. There is thus considerable danger of an animal escaping detection.

Distomiasis.—A few cases were seen in slaughtered cattle imported from Dar-es-Salaam.

Echinococcosis.—Some infections were seen in the lungs and livers of slaughtered milch cows and calves, mostly of the Indian breed.

Goats and Sheep.

Sarcoptic Mange.—An outbreak of this disease occurred among a herd of 18 goats kept at Kisimamajongo. They were dipped and recovered.

Hæmonchiasis.—This helminthic infection causes considerable loss among imported sheep and lambs. On the other hand, from data collected in the abattoir, all local goats are heavily infected, with no apparent loss of health. The local goats appear to have acquired immunity.

Pleuro-pneumonia.—Pleuro-pneumonia is common among imported sheep and goats, and it is usually for this disease that carcasses are condemned.

Oesophagostomiasis.—This is very common among local goats.

B. Diseases of Equines.

Horse-Sickness.—One case occurred during the year in a horse stabled at Ziwani. It is of interest to note that all infections have been contracted outside the town. Probably the night-flying, blood-sucking insect which may be responsible for transmission does not occur in the town where horses do well, although not protected by mosquito netting.

Glanders.—No case reported or seen. All horses and mules imported into the Protectorate and not accompanied by satisfactory certificate are subjected to the "Mallein" test.

Epizootic Lymphangitis.—Two donkeys suffered from this disease; one was treated and recovered, the other was destroyed.

Tetanus.—One case was diagnosed in a donkey and the animal destroyed.

Trypanosomiasis.—Seventy-nine donkeys were examined and three showed T. congolense in their blood.

C. Diseases of Canines.

Piroplasmosis.—Of five dogs examined for this disease, one was positive. It was successfully treated with trypan-blue.

Rabies.—No case reported or seen.

Cordylobia anthropophaga.—The larvæ of this fly cause cutaneous myiasis in dogs. Generally the belly and the flanks are involved. At times as many as fifty or sixty larvæ have been removed from one dog. The pariah dogs of the shambas have the habit of lying and sleeping beneath the eaves of their owners huts, and it is noticed that the earth has been dug out and forms a sort of bed where the flies attracted by the smell, deposit their eggs and thus cause infection. The larvæ of Cordylobia anthropophaga have been found in man, dog, guinea-pig and rat.

D. Diseases of Birds.

Fowl Cholera.—There were a few outbreaks of this disease, in one instance accompanied by a heavy mortality.

Coccidiosis.—This disease was diagnosed in two ducks, one chicken and one guinea fowl.

SECTION III.—GOVERNMENT DAIRY, MJI MPIA.

During the year the average number of cattle housed at Mji Mpia was 205 cows, 16 bulls and 137 calves. Of these, 158 cows, 12 bulls and 113 calves were kept in the Government dairy sheds which are rented by the owners. For the remainder, the owners have built approved sheds at their own cost on Government ground adjacent to the dairy site.

The general health of animals remained good. There was no serious outbreak of any infectious disease. Only two (both fatal) cases of East Coast Fever occurred in young calves, the owner of which had evaded dipping.

During the year four Indian owners refused to dip their cattle. They were prosecuted under the "Diseases of Animals Decree" and fined.

I should again like to point out that the drainage system of the dairy site at Mji Mpia still remains most unsatisfactory. As long as such conditions remain there is no possibility of assuring a clean and wholesome milk supply. It is hoped that action will be taken during the coming year.

All animals at Mji Mpia were dipped regularly at five-day intervals. This system has been in force for more than five years. During the coming year it has been decided to dip once a week, as presumably most of the infected ticks on the pasturages used by the Mji Mpia cattle have by now been killed.

The total number of dippings performed during the year was 22,771 (cows 13,806 and calves 8,965). The dipping fluid is analysed monthly by the Government Chemist.

The majority of cows housed at Mji Mpia are grade animals imported from Kenya.. After producing two or three calves, many cows become sterile and abortions also occur. I am unable to give any explanation for this phenomenon. It may be due to changed conditions in climate, feeding, etc.

SECTION IV.—MEAT INSPECTION.

All animals are killed at the Government abattoir under the supervision of the Veterinary Division.

Animals for slaughter are brought to the abattoir in the afternoon before slaughter, when an ante-mortem inspection is made, and unfit animals are rejected.

Slaughtering begins at 4 a.m., and the dressed carcasses are examined before removal to the market. "Measly" meat, if only slightly infected, is thoroughly boiled on the premises and sold at a cheap rate. Otherwise the carcass is burned.

During the year 15,005 animals were slaughtered and of these 6,075 were partially and 97 wholly condemned.

Occasionally, sanction is given by the Senior Commissioner, after consultation with the Sanitation Officer, to slaughter an animal (usually a goat) on private premises for religious purposes. Such animals are also inspected before being slaughtered.

SECTION V.—PIGADURI QUARANTINE STATION.

All live-stock imported into the Protectorate undergo a period of quarantine; for cattle a fortnight and for goats and sheep five days. Horses and mules imported and not accompanied by a satisfactory certificate of health are subjected to the "Malein" test.

Blood films are taken from many imported animals and examined for trypanosomes; any found infected are forthwith slaughtered or, if the owner so wishes, returned to their port of origin.

Dogs and cats are not allowed to be imported unless accompanied by a certificate from a qualified Veterinary Surgeon to the effect that the animal is free from rabies.

The dipping tank was continuously in use throughout the year, cattle being dipped at a three-day interval. The dippings numbered 5,106.

SECTION VI.—LAIRAGE FOR GOATS.

The existing sheds are now satisfactory and there have been no further complaints from the lessees.

SECTION VII.—RECOMMENDATIONS.

(1). A small dispensary is required at Mji Mpia Dairy for cases of emergency and for the every-day treatment of sick animals. There are 360 odd animals on the dairy premises and at present no facilities exist there for treatment (*see* Annual Report, 1927).

(2) Veterinary activities should be extended in Pemba, and the necessary buildings, including acommodation for the officer-in-charge, provided. A service similar to that in Zanzibar should be aimed at.

(3) *Imporvement of Stock.*—The indigenous cattle of the Protectorate are of the Zebu breed, short in the legs, muscular and quick in their movements. Such animals are eminently suited for carting purposes. As beef animals they are small, producing an average of 250 lbs. dead weight. Being grass-fed, they afford excellent eating, and from this point of view are far preferable to the animals imported from the various East African ports. They average in price from Rs. 70 to Rs. 80 and are not, therefore, very popular with the local

butchers, who prefer to buy the large Boran cattle of Jubaland, averaging 350 lbs. to 400 lbs. dead weight.

The cows are poor milkers, producing an average of four pints of milk per day, the quality of the milk, however, is excellent, showing at least 5 per cent of fat, in some cases more, and the animals require little attention.

During the dry season the local pasturages to a great extent dry up, but these local cows, being excellent rustlers, are always able to find sustenance without need for extra rations or shelters. Various tropical diseases, such as East Coast Fever, Texas Fever, etc., are endemic and, as far as has been ascertained, do not cause great losses in the indigenous stock.

All these points—pasturage, immunity, housing, etc.—should be carefully considered before the importation of European, Indian or other half-bred stock is undertaken.

I would rather advocate the exchange of male stock between local herds. For instance, the buying of some good type bulls from Pemba and placing them with the herds in the south of Zanzibar island might have beneficial results. If this experiment proves successful Zanzibar bulls likewise could be sent to Pemba. If any stud bulls are procured from the mainland, they must be immunised against East Coast Fever and Rinderpest.

TABLE I.

Comparative Table of deaths amongst Stock in Zanzibar Town and Quarantine Station during the three years 1926-1928:—

	1926.	1927.	1928.
Milch Cows	59	96	18
Calves	52	79	23
Cart Bullocks and Oxen	21	13	8
Goats	136	25	34
Sheep	21	—	3
Horses	3	2	6
Donkeys	19	23	20
Mules	8	1	3
Buffaloes	1	—	—
Camel	—	1	—
Totals	320	240	115

The above Table shows a considerable decrease in the number of deaths during the year under review. The dairies at Mji Mpia remained free from any contagious or infectious disease. The slight increase of deaths in goats and sheep was due to an outbreak of contagious pleuro-pneumonia. The figures for 1928 include two horses, five donkeys and one mule, destroyed on account of old age or injury.

TABLE II.

Comparative Table of animals imported during the three years 1926-1928: —

	1926.	1927.	1928.
Oxen	3,195	2,666	1,956
Cows	91	67	21
Calves	67	53	7
Goats	12,100	6,105	7,133
Sheep	3,657	2,849	2,759
Horses	14	—	—
Mules	7	—	—
Donkeys	18	23	20
Camels	14	—	2
Dogs	2	—	1
Totals	19,165	11,763	11,899

It will be seen from the above Table that, with the exception of goats, there has been a marked decrease in the number of animals imported into the Protectorate. General financial depression would appear to be the reason for the decrease.

TABLE III.

Comparative Table of animals exported during the three years 1926-1928: —

	1926.	1927.	1928.
Oxen	345	267	97
Cows	31	1	1
Calves	—	—	1
Goats	619	312	63
Sheep	20	31	10
Camels	3	12	—
Horses	1	3	—
Mule	—	—	1
Donkeys	47	32	16
Dog	—	—	1
Totals	1,066	658	190

This Table again shows a decrease in the number of animals exported. The majority of exported animals from Zanzibar are sent to Pemba.

It has been ascertained that a number of indigenous oxen have been killed. In former years many of the Kismayu cattle were re-exported from Zanzibar to Pemba for slaughter.

Table IV.

Table showing the number of animals treated as in- and out-patients during the year 1928: —

Horses	194	Dik-dik	1
Mules	33	Dogs	318
Donkeys	658	Cats	11
Cows	192	Chickens	23
Calves	17	Parrots	23
Bulls	181	Other cage birds	4
Camels	6	Monkeys	4
Goats	7		
		Total	1,672

The above Table includes both new cases and repetitions.

The majority of animals treated were the property of the Government or cruelty cases brought by the police.

Table V

Table showing the number of animals examined and slaughtered in the Government Abattoir during the year 1928, compared with the previous two years: —

Species.	Slaughtered in Government Abattoir.			Carcasses Condemned.					
				Wholly.			Partially.		
	1926	1927	1928	1926	1927	1928	1926	1927	1928
Oxen	2,914	2,503	2 131	58	37	33	2,413	1,792	1,845
Cows	47	49	256	..	..	4	17	14	22
Calves	47	37	98	..	..	..	2	10	2
Goats	12,855	10,856	10,256	156	31	35	3,557	2,734	3,006
Sheep	3,282	2,311	2,261	4	8	25	1,695	901	1,200
Camels	3	4	3	..	.	..	4	3	..
Totals	19,148	15,760	15,005	218	76	97	7,688	5,454	6,075

Thirty seven carcasses were condemned for C. bovis. Thirty-five goats and twenty-five sheep were condemned for pleuro-pneumonia and emaciation. No case of tuberculosis in any animal was detected.

Of indigenous animals, 520 bulls, 256 barren cows, 98 calves and 3,264 goats were slaughtered during the year. These figures show that the Protectorate can and does supply a fair proportion of its own meat. In former years the majority of animals were imported from Kismayu and other northern Somali ports.

It is a well-known fact that both our local beef and mutton is far superior to that imported from Kismayu. Local animals are generally in prime condition when brought to the abattoir. On the other hand, many of the beasts from Kismayu could only be described as walking skeletons. As was suggested some years ago by the Veterinary Adviser, our natural live-stock market should be our own islands or the adjacent mainland of Tanganyika Territory.

Table VI.

Table showing the number of examinations carried out in the Veterinary Laboratory during 1928:—

	Number Examined.	Positive.	Negative.
Trypanosomiasis (local stock):			
Oxen	12	—	12
Cows	24	1	23
Calves	4	—	4
Horses	6	—	6
Donkeys	79	3	76
Mules	5	—	5
Dogs	6	—	6
Monkey	1	—	1
Camels	4	—	4
Goat	1	—	1
Total	142	4	138
Trypanosomiasis (imported stock):			
Oxen	335	44	291
Cows	18	1	17
Calves	4	—	4
Total	357	45	312
East Coast Fever (local stock):			
Cows	24	3	21
Calves	24	5	19
Total	48	8	40
East Coast Fever (imported stock):			
Oxen	4	2	2
Piroplasmosis:			
Dogs	5	1	4
Coccidiosis:			
Guinea fowl	1	1	—
Chickens	4	1	3
Ducks	2	2	—
Tetanus:			
Donkey	1	1	—
Epizootic Lymphangitis:			
Donkeys	2	2	—

Table VII.

Table showing the number of Post-Mortems performed during the year 1928.

	Rinderpest	E. C. Fever	Septicæmia	Senility	Pneumonia	Colic	Tympanites	Malnutrition	Tetanus	Epizootic Lymphangitis	Coccidiosis	Gastro-enteritis	Enteritis	Aneurism	Undiagnosed	Total.
Oxen	31	..	..	..	2	1	2	..	..	..		..	1	..	..	37
Cows	..	..	5	..	1	..	1	..	..	..	..	1	..	..	1	9
Calves	..	3	..	..	..	..	..	2	..	..	..	..	..	..	..	5
Mules	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	2
Donkeys	..	..	..	..	..	1	..	..	1	1	..	..	..	..	..	3
Dogs	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1	3
Guinea-fowl	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1
Chickens	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	2
Ducks	..	..	..	..	..	..	..	..	..	..	2	..	..	..	1	3
Total	31	3	5	1	3	3	3	2	1	1	4	2	1	1	4	65

SHAH MOHAMMED KHAN,

Veterinary Officer.